MP 700 Series GPS
Rugged Wireless Modem

AT Command Reference

2130309
Rev 3.2

SIERRA WIRELESS
HEART OF THE WIRELESS MACHINE®

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6,339,405	6,359,591	6,400,336	6,643,501	6,516,204
6,561,851	6,653,979	6,697,030	6,785,830	6,845,249
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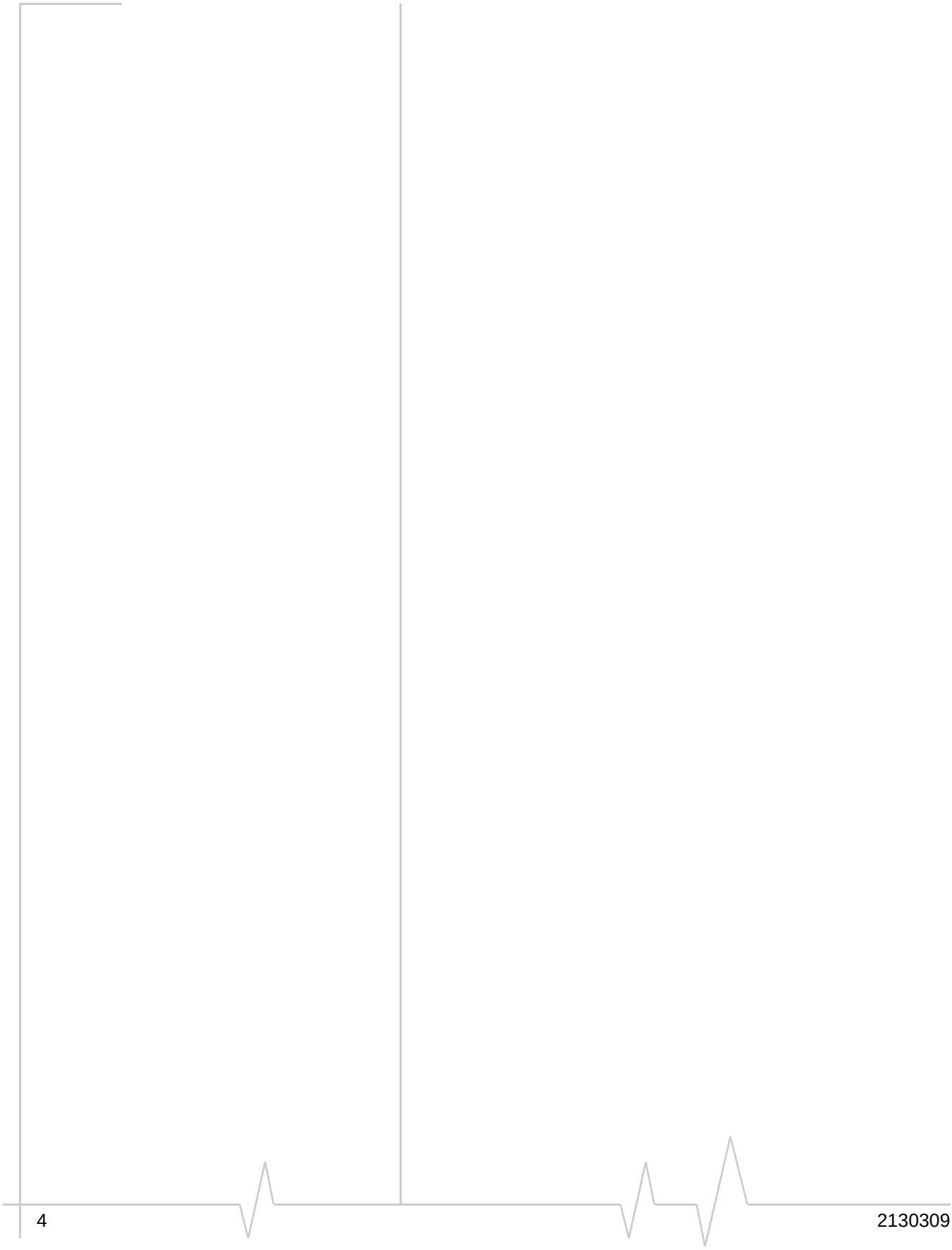

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1: About This Guide

- Introduction
- References
- Currency
- Document Structure
- Conventions

Note: For additional background on the use of modems and AT commands generally you may consult the University of Manitoba web site at: www.umanitoba.ca/campus/acn/remote/faq/at-cmds.html.

Introduction

This reference details the Attention (AT) command set supported by the MP 700 Series GPS rugged wireless modem.

You should be familiar with the use of AT commands with standard wireline modems to use this document.

The Sierra Wireless GSM products present two methods of controlling the modem: AT commands and CnS (Control and Status) language. Some features or capabilities of the modem require the use of CnS. This document presumes that the AT interface is the only interface available to you; features requiring CnS are not discussed.

References

This guide covers only the command set used by the MP 700 Series GPS and does not deal with operational use. Refer to the product documentation for instructions on using your modem.

Not all commands include detailed descriptions. Commands are implemented to be compliant with industry standards and reference is often made to the following standards:

- IS-131 (Data Transmission Systems and Equipment - Extensions to Serial Asynchronous dialing and Control)
- EIA/TIA-592 (Asynchronous Facsimile DCE Control Standard, Service Class 2)
- EIA/TIA/IS-134 (Amendments to TIA-592 to Support T.30-1993 (Facsimile protocol standard))

Electronic copies of these standards can be purchased at the ANSI Electronic Standards Store at: webstore.ansi.org. ANSI Customer Service will respond to inquiries about standards information at: sales@ansi.org.

Requests for hard copies of standards should be directed to the Global Engineering Documents Division of Information Handling Services:

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Global Engineering operates offices around the world. Consult the web site above for locations.

Other standards referenced in this document are available through the 3rd Generation Partnership Project (3GPP) web site at www.3gpp.org, and the International Telecommunications Union Standards Division (ITU-T) at www.itu.int. They include:

- ETSI TS 100 916 V7.5.0 (1999-12) (AT Command Set for GSM Mobile Equipment)
- V.25*ter* (ITU-T recommendation V.250), GSM 07.07, and GSM 07.05 standards
- 3GPP TS 24.008: *3rd Generation Partnership Project; Mobile Radio Interface Layer 3 specification; Core Network Protocols-Stage 3*

You may also want to consult the other documents available on the Sierra Wireless web site at www.sierrawireless.com.

Terminology and acronyms

This document makes wide use of acronyms that are in common use in data communications and cellular technology. Our Internet site provides a Glossary (document #2110032) that may be helpful in understanding some acronyms and terminology used in this guide.

Currency

This document is current with version R2_2_7ap of the MP 750 GPS firmware and version R3_1_2ap of the MP 775 GPS firmware.

Upgrading

If your modem firmware is an earlier version, you can acquire updated firmware from our web site (www.sierrawireless.com) or by contacting your wireless carrier.

Note: For additional background on the use of modems and AT commands generally you may consult the University of Manitoba web site at: www.umanitoba.ca/campus/acn/remote/faq/at-cmds.html.

Document Structure

Following this introduction is a section on basic elements important to understanding and communicating with the MP 700 Series GPS. This includes notes on the connection between the host computer and the modem.

The document then presents the commands, registers, result codes, and defaults provided in the command state of the modem.

Commands are often termed *AT commands*. Hayes™ originated the convention of prefixing commands with an "ATtention" string for wireline modems.

In addition to the commands, this document also describes the definitions and use of status registers.

Commands are referenced in strict alphabetical order. This facilitates searches for the syntax, parameters, and operation of specific commands. To help locate whether or not a command exists to perform a desired function, there are tables organizing the commands into groups.

Descriptions of the definitions and use of status registers, as well as a table of the factory/reset defaults, follow, along with result codes, both numeric and verbose.

Conventions

The following format conventions are used in this reference:

- Character codes or keystrokes which are described with words or standard abbreviations are shown within angle brackets using a different font: such as <CR> for Carriage Return and <space> for a blank space (spacebar) character.
- Numeric values are decimal unless prefixed as noted below.
- Hexadecimal values are shown with a prefix of 0x, i.e. in the form 0x3D.
- Binary values are shown with a prefix of 0b, i.e. in the form 0b00111101.
- Command and register syntax is noted using an alternate font: **ATD6045559010**.

Note: The **AT** *characters must be included before all commands, except as noted in the reference tables.*

- Characters that are required are shown in uppercase; parameters are noted in lowercase. Parameters are enclosed in angle brackets (**<i>**) to indicate that they should be replaced with a value. Optional parameters are described in the text, and may also be enclosed in square brackets (**[<m>]**) for clarity.
- Supported parameter values (either set or returned) are described in the text.

*Note: The brackets shown with parameters are **not** to be included in the command string.*

The default settings are noted in the command tables. Note that these are the factory default settings and *not* the default parameter value assumed if no parameter is specified. The factory defaults are also noted in a section at the end of the Commands chapter, on page 107.

Result Code This is a numeric or text code that is returned after all commands (except resets). Only one result code is returned for a command line regardless of the number of individual commands contained on the line.

Response This term indicates a response from the modem that is issued prior to a result code. Reading registers or issuing commands that report information will provide a response followed by a result code unless the command generates an error.

See page 20 for a discussion of how the modem frames these two elements.

In this document, responses and result codes from the modem, or host system software prompts, are shown in this font:

```
CONNECT 14400
OK
```

2: Modem Basics

2

- GSM, GPRS, and EDGE
- Modem modes, states, and conditions
- State Transitions
- Modem Buffers
- Command Handling
- Responses and Result Codes
- Response and Result Framing
- GPS data format

This section provides the information required to:

- Establish a communications session with the modem that will allow you to enter AT commands
- Understand the operating modes and states of the modem and what causes the modem to transition between them
- Understand which commands are available during connections and which are not
- Understand how the modem's results and responses are framed and change the framing where required

GSM, GPRS, and EDGE

The MP 700 Series GPS operates on GSM network technology. GSM (Global System for Mobile communications) is a type of wireless communications network designed for mobile phones that is widely deployed throughout the world. GPRS (General Packet Radio Service) and EDGE (Enhanced Data rates for GSM Evolution) are add-on data services to GSM networks. GPRS provides a maximum data transmission speed of 56 kbps while EDGE provides a maximum data transmission speed of 216 kbps. The MP 750 GPS supports GPRS while the MP 775 GPS supports GPRS and EDGE service.

GPRS service has been implemented on most GSM networks but there are a few areas (mainly rural areas in Europe) with GSM coverage but no GPRS service. EDGE is less widely implemented. The MP 700 Series GPS modem is primarily designed to provide GPRS/EDGE data connections but the modem can also be configured (using the Fallback feature) to

establish CSD (Circuit-Switched Data) connections in areas that have GSM but no GPRS/EDGE service (assuming CSD is supported by your service provider).

Establishing a communication session

Any terminal emulation program can be used to create a communications session that will allow you to issue AT commands to the modem. This section describes how to use HyperTerminal, a program typically installed with Windows, to establish a session with the modem.

To establish the communications session:

1. If the modem is not already connected to a serial port on your computer, connect it.
2. If open, close Watcher (or any other program that communicates with the modem).
3. Launch HyperTerminal. (Depending on your version of Windows and how it was installed, you can launch the program by selecting **Start > Programs > Accessories > Communications > HyperTerminal**.)
4. Enter any name and select any icon in the Connection Description window and click **OK**.
5. Select the COM port to which the modem is connected (usually **COM1**) in the **Connect using** field, and click **OK**.
6. Select these port settings:
   - **Bits per second** 115,200
   - **Data bits** 8
   - **Parity** None
   - **Stop bits** 1
   - **Flow control** Hardware

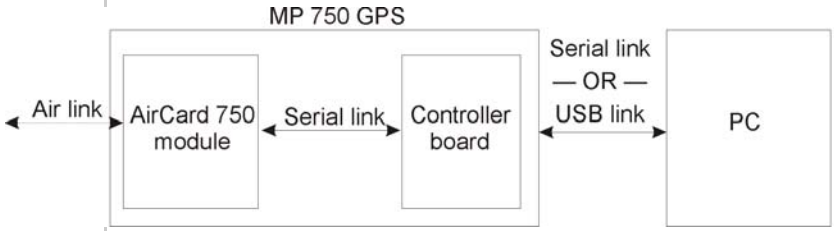
   Click **OK**.

To verify that the communications session is functional, enter **AT**. The modem should respond with OK.

Host connection basics

Hardware structure

The MP 700 Series GPS has two main components: the AirCard® wireless network card and the controller board. Each of these components has its own firmware (resident software). There is a serial link between the AirCard and the controller board.

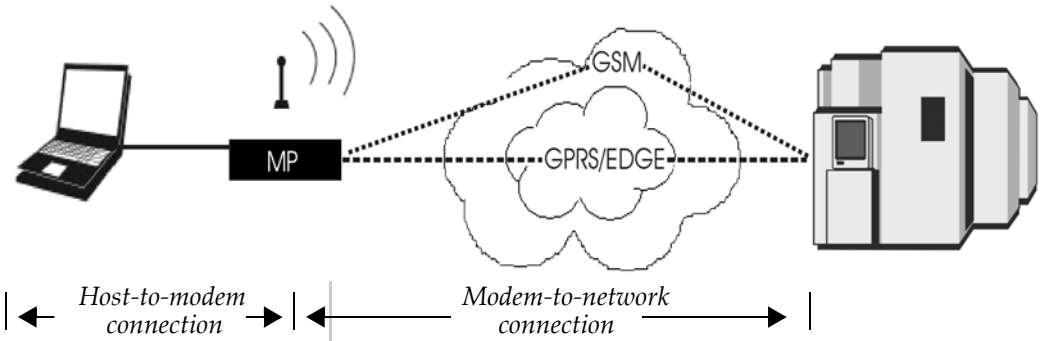


All AT commands that begin with **AT!MP** are handled by the controller board and all others are handled by the AirCard.

It is important to recognize these two command types because during *modem-to-network* connections, the MP 700 Series GPS does not respond to AirCard AT commands. (That is, only **AT!MP** commands will work.) This means that it is not possible to, for example, check the signal strength using the command **AT!RSSI?** during a *modem-to-network* connection.

Host and network connections

When the MP 700 Series GPS is used to access Internet services or retrieve data over a VPN connection, two connections are required: the *host-to-modem* connection and the *modem-to-network* connection.



Note: If you are developing a network application to control or monitor MP 700 Series GPS modems installed in a fleet of vehicles, it is usually best to use Always On mode. (With On Demand mode, it can be difficult to track the modems' IP addresses.)

Modem-to-network connection

The operating mode determines how the *modem-to-network* connection is established. In **Always On** mode, the *modem-to-network* connection is established whenever the modem is powered and GPRS/EDGE service is available. In **On Demand** mode, the *modem-to-network* connection is established only when the *host-to-modem* connection is requested.

Regardless of the operating mode, the *modem-to-network* connection is established as needed, if the modem has been configured to send MTP data. (See the **AT!MPMTCONF** command on page 50.)

Host-to-modem connection

The MP 700 Series GPS supports serial and USB host connections. To issue AT commands to the modem, the serial connection is required. Having a USB connection in addition to the serial connection has two main advantages:

- USB provides a higher data rate between the host and the modem
- With a USB connection, the modem connects instantly to the network on startup. With only a serial connection, you must establish the connection using Watcher or Windows DUN (Dial-Up Networking.) With a USB host connection, and the operating mode set to **Always On**, it is not necessary to run Watcher or DUN to make connections.

Note: The AT command **AT!MPOPMODE** *is used to set the operating mode.*

If you intend to have both a serial and USB connection, you must install the modem using the USB option. (When you install the modem software, you are prompted to indicate whether you are using a serial or USB connection. When you select the USB option, both the serial and USB drivers are installed.) If you install the modem using the serial option and then connect a USB cable, the host computer will not be able to communicate with the modem.

Modem modes, states, and conditions

This document uses the words *mode* (circuit-switched data, packet-switched data, fax, or voice), *state* (command or data), and *condition* (online or offline) to describe the modem's operational status.

Connection Modes

The MP 700 Series GPS operates in three modes:

Circuit-switched data (CSD) In Circuit Switched Data (CSD) mode, the modem operates much like a landline modem.

The Fallback feature must be configured to allow for this type of connection. (See **!MPFBSETUP** on page 41.)

Packet-switched data In this mode the modem establishes a high-speed packet data connection using GPRS or EDGE service.

Voice If your account allows for it, you can attach a headset to your modem and use it as a mobile phone. You require a 4-wire headset with a 2.5 mm connector, to use your modem as a phone. (This plugs into the Audio connector on the back of the modem. You may need an extension cable if the modem is installed in the trunk. Contact your service provider to determine what extension cables are supported.)

States

The modem's *state* indicates what form of communication is occurring between the modem and the host computer.

At any time the modem is in one of two states:

Command The modem exchanges data with the host computer as AT commands and replies. During voice communications the modem is always in command state.

Data The modem exchanges computer data with the host.

Note: The modem cannot be in voice mode and data state. Even while off-hook with a voice call active, the modem still communicates over the serial connection in command state. Commands can be issued and executed while a voice call is in progress.

Conditions

The modem's *condition* indicates whether there is a network connection (airlink). At any time, the modem is in one of two conditions:

Online Actively connected to a remote terminal or network (off-hook). In the online condition, the modem can either be in command state or in data state.

Offline Disconnected from any remote terminal or network (on-hook). While in offline condition, the modem can only be in command state (without an airlink).

The following tables show the possible combinations of modes, states, and conditions:

Table 2-1: Functional combinations of modem state and mode

	Command State	Data State
CSD Mode	Yes	Yes
GPRS Mode	Yes	Yes
Voice Mode	Yes	***No***

Table 2-2: Functional combinations of modem state and condition

	Command State	Data State
Online Condition	Yes	Yes
Offline Condition	Yes	***No***

State Transitions

The auto connect feature (see **!MPPADSETUP** on page 54) determines what state is established when the modem is powered:

- If autoconnect is enabled, on start-up the modem is in data state. (A PAD session is established, but not necessarily an Internet connection.)
- If autoconnect is disabled, on start-up the modem is in command state.

Command to data state

Note: A transition to command state from data state does not require that the session be closed. This means that DCD will remain asserted while the modem is in command state, online condition.

The modem changes from command to data state when a session is opened either by dialing a connection, or by answering a data call. When a session opens, the modem issues the CONNECT message and, depending on the DCD setting (see page 58), asserts the DCD control signal.

Data to command state

The modem changes from data to command state when:

- The DTR de-asserts (depending on settings made, **&D1** or **&D2**).
- The modem is reset or power-cycled (if autoconnect is disabled).

- If there is an active PAD (Packet Assembler/Disassembler) session and the PAD is configured to use TIES (Time Independent Escape Sequence), the modem switches to command state on receipt of "**AT+++**". (The "AT" must be in upper case.) The command !MPPADCONF (described on page 52) is used to enable and disable TIES.

When the modem changes to command state, it will issue an OK result. This may be preceded by another result (such as NO CARRIER) to indicate that the session was closed by an event outside the modem. The modem returns to command state when a session is closed.

Modem Buffers

Communication between the host and modem is buffered based on the modem's state.

Command buffer

When in command state, the modem buffers the input from the host until a **<CR>** is entered. The buffered data can be edited using the backspace **<BS>**. The modem (unless Echo is enabled) echoes the sequence <BS><space><BS> for human readability.

There is a limit of 200 characters to one command line, including the **AT** prefix and the **<CR>** termination (i.e. 197 characters of useful command buffer). If the command buffer length is exceeded the modem will continue to echo input (which is not buffered) until the **<CR>** is received. When the **<CR>** is entered, the modem returns the ERROR result code without executing any commands in the line. Once over the limit, the **<BS>** will not bring you back under the limit; the ERROR code is still returned.

The command buffer is distinct from the data receive and transmit buffers. The command buffer retains the contents of the last issued command until the **AT** command prefix is received for the next command. This allows repeating of the last issued command by entering **A/**.

Data buffers

Data being transmitted or received is buffered in several ways depending on the mode and nature of the connection. Some caution must be taken when disconnecting to ensure that any buffered data in the modem has been properly processed prior to breaking the connection.

Specific settings for buffer controls are described in the relevant commands and registers. Normal configuration of the modem will not require you to adjust these settings.

Data flow control The modem's CTS and RTS lines control data flow. Where large amounts of data are being exchanged, local hardware flow control must be used to prevent buffer overflows; it is required for PPP connections. Hardware flow control is enabled by default. (See the **+IPR** command on page 98).

Command Handling

AT can be issued as a command without parameters. It acts like a "ping" to the modem and always gives a result code of OK (unless quiet mode is enabled).

Commands are not case-sensitive; they may be entered in upper or lower case, or a combination. Arguments to commands may be case-sensitive.

Concatenation

Note: When concatenated together, AT commands may not function predictably. It is best to avoid concatenating commands without first testing and verifying the results.

More than one command can be included in a single line, although some commands or their parameters must be placed at the end of the line. When concatenating commands, a space between basic commands is optional. Where extended commands (those beginning with a non-alphabetic character after the **AT**) are concatenated, they must be separated by a semicolon (**;**).

Commands are executed in the order entered. If a command results in the ERROR result code the balance of the command line is ignored. Only one result code is returned for the entire command line. The complete concatenated command string must not exceed the 200-character command buffer limit. (See page 17).

Parameters

Most AT commands support one or more parameters, usually a number. Allowed values are specified in this reference.

Commands that normally accept a single numeric option switch (**[<n>]**) and are issued without that parameter will assume a value of zero (**0**).

Note: Entering incorrect syntax or a parameter outside of the specified range may have unexpected results.

Defaults shown in the command tables are those for the factory settings of the modem. They are *not* the defaults assumed for a command issued without parameters, which are noted in the text.

Registers

Some registers are read only. Attempting to write to them yields an ERROR result code.

Some registers store the setting of commands. Changing the register is equivalent to changing the command setting.

The table for S registers indicates the standard default values. The factory defaults are also noted in a separate sub-section.

Responses and Result Codes

Most commands return only a result code; however, some commands request information, which is provided by the modem as a response prior to the result code.

Possible result codes

Result codes are not shown in the command tables unless special conditions apply. Generally the result code OK is returned when the command has been executed. ERROR may be returned if parameters are out of range, and will be returned if the command is not recognized, or the command is not permitted in the current mode, state, or condition of the modem.

See the table on page 106 for a listing of result codes.

Human vs. machine interface

The AT command interface was designed for human interaction. When an intelligent host is managing a modem, the interface may need to be altered (result code words replaced with numbers, for example). Framing characters (line feeds and carriage returns) must be properly understood to ensure the host system properly parses the responses and result codes.

As shipped, the modem is configured with these settings:

- Echo enabled (**E1**) causes the modem to echo characters received from the host back to it while in command state. The backspace is echoed as <BS> <space> <BS> in order to erase the last character.

- Quiet off (**Q0**) enables the modem to issue result codes following commands. Quiet on (**Q1**) suppresses result codes entirely; responses remain unaffected.
- Verbose result codes enabled (**V1**) provides results in English text appended with <CR><LF>. Verbose off (**V0**) returns the results as ASCII numeral codes. Numeric codes are much easier to process using software.

With Echo on (**E1** - the default) data received from the local host while in command state is echoed back to the host. This can present problems to machine control, which is not interested in an echo of its own commands to the modem. In some configurations the echo should be turned off (**E0**).

Response and Result Framing

Depending on the modem configuration, modem responses and result codes are framed, typically with the <CR> and <LF> characters.

If you are designing or customizing software that will interface with the modem using AT commands, it is necessary to understand how the modem frames its responses and result codes.

Framing Characters The modem frames its replies with carriage return and line feed characters as they are defined in registers **S3** and **S4** respectively. These are normally the ASCII value 13 for carriage return (<CR>) and 10 for line feed (<LF>). (The following discussion assumes that <CR> and <LF> are used.)

Response framing

Regardless of how the modem is configured, responses to commands are in the form of ASCII text with a trailing <CR><LF>. Where a response has more than one line, each line is terminated with a <CR><LF>.

When the Verbose setting is on (**ATV1**, see page 102) each response has a leading <CR><LF>. If Verbose is off (**ATV0**), there are no leading characters prior to the first line of response.

The setting of Quiet (**ATQ**, see page 102) has no impact on responses.

Result code framing

Every command will return a result code unless the Quiet command is enabled. If Quiet is on (**ATQ1**, see page 102) then neither framing characters nor result code is returned.

A leading <CR><LF> is inserted ahead of the result code if Verbose is on (**ATV1**, see page 102). Otherwise there are no leading characters prior to the ASCII numeral result. The result code is always followed by a <CR>. There is a trailing <LF> only if Verbose is on. For example, the result code OK appears as:

- <CR><LF>OK<CR><LF>
  if verbose is on (**ATV1**)
- 0<CR>
  if verbose is off (**ATV0**)

When **ATV1** is set and there is an error, <CR><LF>ERROR<CR><LF> is sent to the host computer and no subsequent commands in the command line are processed. If **ATV0** is set, result code 4<CR> is sent instead.

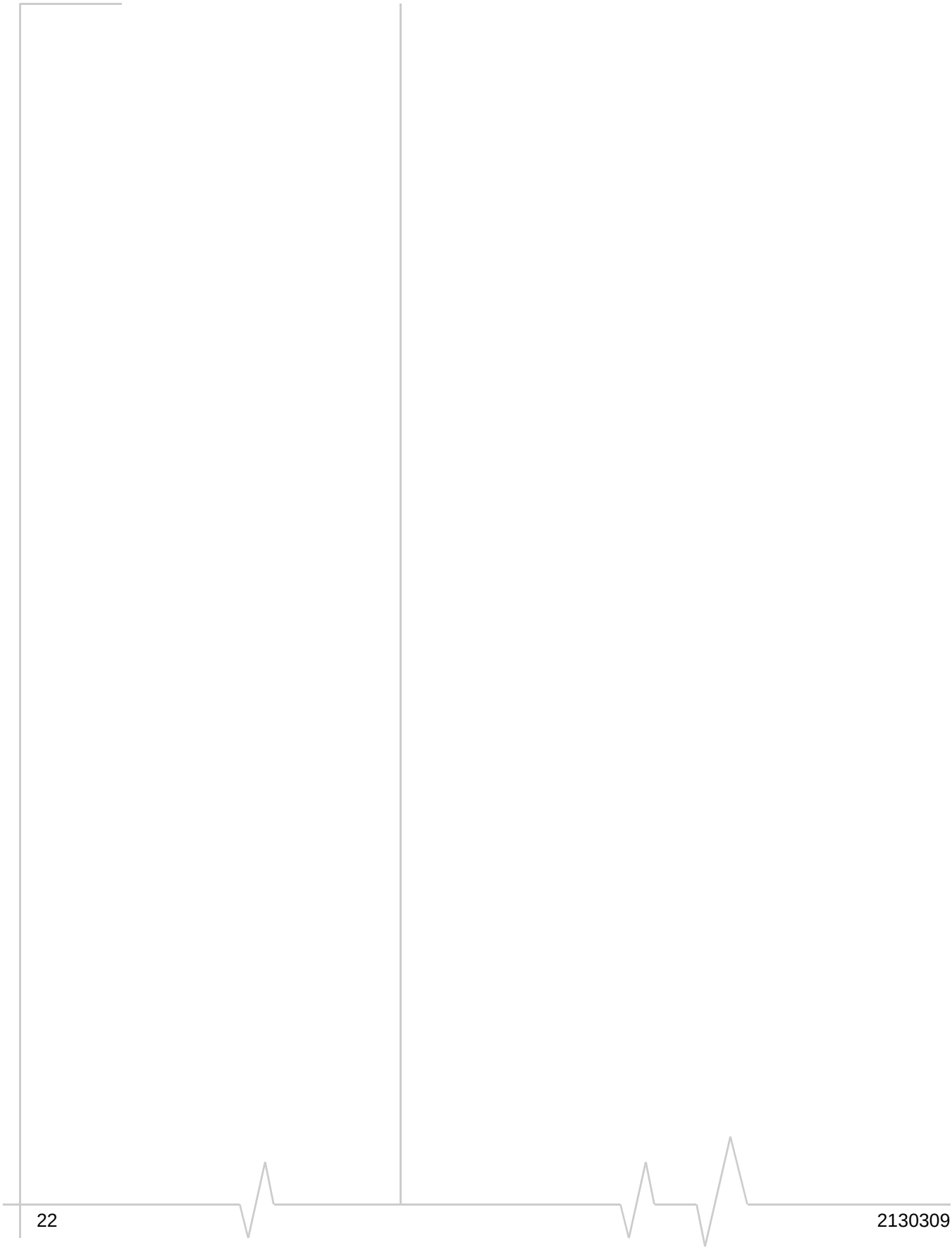
The ERROR (or 4) response may be replaced by +CME ERROR: <err> when the command is not processed because of a GSM radio connection error.

GPS data format

The MP 700 Series GPS sends GPS data out in UDP packets. The packets contain either:

- TAIP or NMEA messages
- Data packets framed according to a Sierra Wireless protocol called RNAP (Remote Network Access Protocol).

RNAP is described in detail in the *Software Installation, Configuration, and Integration Guide* on the CD that is shipped with the MP 750 GPS.



3: Command Reference

3

- Introduction
- Command Types
- Command Reference Table
- Result Codes
- Factory Default Settings

Introduction

As described in the previous section, AT commands are available with Sierra Wireless GSM products for users of the COM serial interface. The commands allow control of Circuit Switched Data (CSD) calls and data exchange, similar to dial-up modems, but without wires, and with additional commands available specific to GSM, GPRS, and EDGE.

The AT command set has grown from the original set used with Hayes™ landline modems to support wireless connections and is now standardized by the Third Generation Partnership Project (3GPP). The commands are defined in the standards known as V.25*ter* (for standard modem commands), GSM 07.07 (for GSM and GPRS) and GSM 07.05 (for text messaging, also known as short message service—SMS). The following sections describe those commands.

AT commands conform by default to the Phase 2 specifications for GSM 07.07 and GSM 07.05. Some AT commands have been implemented according to Phase 2+ in order to support extended features, such as 14.4 kbps CSD connections.

Note: Not every GSM/GPRS product supports all commands.

The AT commands provide the following features for Sierra Wireless GSM devices:

- Voice service
- Short Message Service (SMS)
- Circuit switched data service (CSD), including V.42*bis* data compression
- GPRS packet data service
- EDGE packet data service

Command Types

Note: The **AT** *prefix does not appear in the reference tables. It is, however, required and assumed for all commands unless specifically noted otherwise.*

The command reference table (beginning on page 31) details the available AT commands in strict ASCII alphabetic order (including character prefixes such as **!**, **&** and **+**, which in ASCII fall before the letters of the alphabet). Sections preceding those tables outline how the commands are organized into functional groups, including:

- Standard modem commands, beginning on page 24.
- GSM voice and circuit-switched data from page 26.
- SMS commands, page 27.
- GPRS packet data commands, page 28.
- EDGE packet data commands, page 28.

Within each functional section, commands also appear in ASCII alphabetic order, with a cross-reference to the full description in the reference table. This format allows quick lookup of each command to verify syntax, parameters, and behaviors.

Standard Modem Commands (V.25*ter*)

Sierra Wireless GSM/GPRS devices support most of the standard AT commands used by telecommunications software for over twenty years.

The following commands are derived from the original 1981 Hayes AT landline modem command set, with some additional commands specific to wireless devices.

These commands have been standardized by the International Telecommunications Union (ITU) as ITU-T recommendation V.250 (also known as V.25*ter*). You can find more information on the standard at **www.itu.int**.

Table 3-3: Standard modem commands

Command	Description	p.
&C	Data carrier detect (DCD) options	58
&D	Data terminal ready (DTR) options	58
&F	Reset modem to factory default	58
&V	Display current modem configuration	58
&W	Store user-defined profile	59
+DR	V.42*bis* compression reporting	96

Table 3-3: Standard modem commands (cont.)

Command	Description	p.
+DS	V.42*bis* compression control	97
+GMI	Modem manufacturer	97
+GMM	Modem model	97
+GMR	Current modem firmware version	97
+GOI	Global object identification	97
+GSN	Display IMEI	98
+IFC	Local flow control	98
+IPR	Fixed local data rate	98
A/	Reissue last AT command	100
A	Answer incoming call (or GPRS network request)	100
ATD**##	Make GPRS connection	100
E<n>	Command echo mode	101
H[0]	Hang up (disconnect)	101
I<n>	Display product identification	101
L (ignored)	Set speaker loudness	101
M (ignored)	Set speaker mode	101
O<n>	Switch from command state to data state	102
P (ignored)	Pulse dialing	102
Q<n>	Quiet—suppress result codes	102
S0=<n>=<x> S<n>?	Status Register Set/Query	104
T (ignored)	Tone dialing	102
V<n>	Verbose result code format	102
Z	Reset modem to user-defined profile	103

GSM Voice and Circuit-Switched Data Commands (GSM 07.07)

These commands are specified in the GSM 07.07 standard and control functions related to GSM voice, and CSD—similar to those provided by many GSM mobile phones.

Table 3-4: GSM commands

Command	Description	p.
+CBST	Select bearer service type	59
+CCFC	Call forwarding number and conditions	60
+CCWA	Call waiting control	61
+CEER	Extended error report	62
+CGMI	Request manufacturer identification	69
+CGMM	Request model identification	69
+CGMR	Request revision identification	69
+CGSN	Display IMEI	72
+CIMI	Request international mobile subscriber identity (IMSI)	72
+CLCC	List current calls	73
+CLCK	Facility lock	74
+CLIP	Calling line identification presentation	75
+CLIR	Calling line identification restriction	75
+CMEE	Report mobile equipment error	76
+COPS	Operator selection	84
+CPAS	Modem activity status	86
+CPBF	Find phonebook entries	86
+CPBR	Read phonebook entries	87
+CPBS	Phonebook memory storage	87
+CPBW	Write phonebook entry	88
+CPIN	Enter PIN	89
+CPWD	Change password	89
+CR	Service reporting control	90
+CRC	Cellular result codes for incoming calls	90

Table 3-4: GSM commands

Command	Description	p.
+CREG	GSM network registration	91
+CRLP	Radio link protocol	92
+CSCS	Character set	93
+CSTA	Type of address	95
+CSQ	Signal quality report	95
+VTD	Tone duration	99
+VTS	DTMF tone generation	99

SMS Commands (GSM 07.05)

The GSM 07.05 standard provides the following commands for controlling text messaging, also known as Short Message Service (SMS).

Table 3-5: SMS commands

Command	Description	p.
+CMGC	Send SMS command	77
+CMGD	Delete SMS message	77
+CMGF	Select SMS message format	78
+CMGL	List SMS messages	78
+CMGR	Read SMS message	79
+CMGS	Send SMS message	80
+CMGW	Write SMS message to memory	81
+CMSS	Send SMS message from storage	81
+CNMI	New SMS message indications	82
+CRES	Restore SMS settings	91
+CSAS	Save SMS settings	92
+CSCA	SMS service center address	93
+CSDH	Show SMS text mode parameters	93
+CSMP	Set SMS text mode parameters	93
+CSMS	SMS message service	94

GPRS Packet Data Commands (GSM 07.07)

These commands, specified in the GSM 07.07 standard, control General Packet Radio Service (GPRS) packet switched data services.

Table 3-6: GPRS commands

Command	Description	p.
+CFUN	Set phone functionality	62
+CGACT	GPRS PDP context activation/deactivation	63
+CGATT	GPRS attach or detach	63
+CGCLASS	GPRS mobile station class	64
+CGDATA	Enter data state	64
+CGDCONT	Define Packet Data Protocol (PDP) context	65
+CGEREP	Unsolicited GPRS event reporting control	68
+CGPADDR	Show PDP address	70
+CGQMIN	Set or query minimum acceptable quality of service	70
+CGQREQ	Request specified (or query current) quality of service profile	71
+CGREG	GPRS network registration status	72
+CGSMS	Select service for SMS messages	72
+CNUM	Retrieves the MSISDN from the SIM	83
+COPN	Read operator names	84

EDGE Data Commands

These commands are only available on products that support EDGE (Enhanced Data rates for Global Evolution).

Table 3-7: EDGE commands

Command	Description	p.
+CGEQMIN	Set or Query Minimum Quality of Service Profile	66
+CGEQREQ	Set or Query Requested Quality of Service Profile	68
+CTMSET	Enable / disable support for CTM / TTY	96

Modem Control Commands

These commands provide monitoring and control of the modem, and are proprietary to Sierra Wireless.

Table 3-8: Sierra Wireless modem control commands

Command	Description	p.
!ACCR	Query SIM code status	31
!BAND	Configure band	32
!GTEMP	Read radio temperature	32
!MPAIN	Report the state of the specified analog input channel	32
!MPAINCFG	Analog input channel configuration	33
!MPAUTHPPP	Enable / disable PPP authentication between the modem and the host PC	33
!MPBARSVC	Bar services	34
!MPCFGDUMP	Dumps configuration	34
!MPCLIENTIP	Report the IP address	34
!MPCONFSNAP	Configure UDP port number	35
!MPCONREJ	Enable/disable reset feature	35
!MPCWINFO	Reset/Display Connection Watchdog statistics	36
!MPCWSETUP	Set Connection Watchdog	36
!MPDIO	Set the value at a specified digital IO channel	39
!MPDIOCFG	Digital I/O channel configuration	40
!MPFBKEND	Set response to GPRS re-acquisition	40
!MPFBSETUP	Configure the Fallback connection	41
!MPFBTIME	Set Fallback timer	41
!MPGCCLR	Clear crash dump data	41
!MPGCDUMP	Read crash dump data	42
!MPGPSCMD	Send TAIP command to GPS module	42
!MPGPSCOMOUT	Enable GPS output to the AT command port	42
!MPGPSDATA	Report current GPS data	43
!MPGPSESC	Set method of escaping from GPS output mode to AT command mode	45
!MPGPSINIT	Set initialization string	45

Table 3-8: Sierra Wireless modem control commands

Command	Description	p.
!MPGPSINTSET	**Set GPS update interval**	45
!MPGPSNMEA	**Set NMEA messages**	46
!MPGPSRESET	**Reset GPS module**	46
!MPGPSST	**Request GPS status**	47
!MPGPSSTOR	**Enable / disable storing and forwarding of GPS records**	48
!MPGPSTAIP	**Set / query TAIP messages sent in RNAP**	48
!MPGPSTRACK	**Set / query GPS tracking for MT reporting**	49
!MPGRESET	**Reset the MP and the PC Card module**	49
!MPGVER	**Query current firmware revision**	49
!MPIDTIME	**Sets the inactivity timeout**	50
!MPIGNSENSE	**Report ignition status**	50
!MPMTCONF	**Configure MT protocol**	50
!MPNVDEF	**Set modem configuration parameters to defaults**	51
!MPOPMODE	**Select operating mode**	52
!MPPADCONF	**PAD configuration**	52
!MPPADCONN[n]	**Establish PAD connection**	54
!MPPADSETUP	**Set up a PAD connection**	54
!MPPDDELAY	**Set power down timer**	55
!MPPRIVIP	**Set the private IP address**	55
!MPSETDFLT	**Set the default GPRS profile**	55
!MPSETUP	**Configure a GPRS profile**	56
!MPSIMSLED	**Report the status of the SIM sled**	56
!MPUSB	**Enable / disable USB operation**	57
!MPWATCHER	**Enable / disable NAT support**	57

Command Reference Table

Table 3-9 details the AT commands for the modem in strict ASCII alphabetic order (with **AT+** before **AT&** before **ATA**). For listings by functional group, see the cross-reference tables beginning on page 24. Detailed status register information (for the **ATS** commands) begins on page 104.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!ACCR?	**Query SIM code status** Returns the status of the SIM, indicating: • whether the SIM is detected • what password, if any, the SIM is requesting • the number of retries available (if applicable) The PIN and PUK codes are used to prevent unauthorized use of the SIM. The PIN code is user-defined. Typically the number of retries allowed on the PIN code is three. If the correct PIN is not entered within this number of retries, the SIM becomes blocked and the PUK code is required. Typically the number of retries on the PUK code is ten. If the correct PUK code is not entered within that number of attempts, the SIM becomes permanently blocked. Some modems are configured for use with SIMs of a particular carrier. The MEP code de-activates the mechanism that restricts the modem to SIMs of a particular carrier. There is no maximum number of retries on MEP codes. **!ACCR?** returns <code>[,<password retries>]. **Supported values** • **<code>="SIM READY"** SIM is detected; no code is requested • **<code>="SIM PIN"** SIM is requesting PIN code • **<code>="SIM PUK"** SIM is requesting PUK code • **<code>="SIM NOT PRESENT"** SIM is not detected • **<code>="SIM MEP LOCK"** Modem is not configured to work with current SIM; MEP code is required to use this SIM • **<code>="SIM NET REJECT"** Invalid account • **<code>="SIM FAIL"** SIM failure The number of retries is reported where <code> = SIM READY, SIM PIN, or SIM PUK. *Note: The SIM is peramanently blocked when !ACCR=SIM PUK,0 is returned.* Use the AT command **+CPIN** (page 89) to enter any codes the SIM is requesting.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!BAND= <band> **!BAND?**	**Configure band** Sets the active radio frequency band, which then remains active until the command is issued again with a different band: • **<band>="900"** EGSM • **<band>="900/1800"** EGSM DCS • **<band>="1900"** PCS • **<band>="auto"** Modem selects the band *Note:* **!GBAND?** returns the current band setting.
!GTEMP?	**Read radio temperature** Returns the temperature of the modem radio as a three-character integer value in degrees Celsius, in the form: !GTEMP: <ddd>
!MPAIN?<chan>, <scale>	**Report the state of the specified analog input channel** The MP 700 Series GPS has four analog input channels, allowing analog sensors and gauges to be connected to the modem. These must be connected to the appropriate pins of the DB15 I/O connector. (See the *Software Installation, Configuration, and Integration Guide* on the MP 700 Series GPS installation CD for more information about configuring I/O devices.) The channels correspond to the pins as follows: • **<chan>=1** Analog input 1—Pin 14 • **<chan>=2** Analog input 2—Pin 7 • **<chan>=3** Analog input 3—Pin 15 • **<chan>=4** Analog input 4—Pin 8 Channels 5, 7, and 8, correspond to test points in the modem. The voltage at these points is measured for diagnostic purposes. Channel 6 reports the battery voltage. Watcher uses this to control the low-battery indicator and display warning messages. The **<scale>** value determines how the state is reported: • **<scale>=0** Reports the raw value (0 to 1023) • **<scale>=1** Reports the scaled value (See **!MPAINCFG**.)

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPAINCFG=<chan>,"<input label>","<unit label>",<zero scale>,<full scale> **!MPAINCFG?=<chan>**	**Analog input channel configuration** Sets the labels and the scale for the specified input channel. **Parameter settings** The supported values are: • Channel **<chan>=** 1 Analog input 1 2 Analog input 2 3 Analog input 3 4 Analog input 4 • Sensor or gauge description **<input label>=** 20 character string • Name of units **<unit label>=** 20 character string • Minimum value **<zero scale>=** 0 to 65535 (Must be less than <full scale>) • Maximum value **<full scale>=** 0 to 65535 (Must be greater than <zero scale>) **!MPAINCFG?** returns the configuration parameter values for the specified channel.
!MPAUTHPPP=<n> **!MPAUTHPPP?**	**Enable / disable PPP authentication between the modem and the host PC** This command is only available on modems with firmware version 2.0 or greater. Controls whether PPP authentication is used in the modem-to-host PC link. (This command has no effect on the link between the MP and the embedded AirCard, over which PPP authentication is always used.) The **<n>** parameter has these settings: • **<n>=1** Enables PPP authentication • **<n>=0** Disables PPP authentication between the modem and the host PC (default) Disabling PPP authentication allows you to use a single dial-up PPP connection on multiple modems with different GPRS profiles. **!MPAUTHPPP?** returns the current setting.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPBARSVC= <value> **!MPBARSVC?**	**Bar services** Controls the type of connections (GPRS or dial-up) that can be made by the modem. (See **!MPFBSETUP** for a discussion of dial-up connections and the Fallback feature.) The **<value>** parameter has these settings: • **<value>=0** **No services barred**—GPRS connections are available; where there is no GPRS service, the modem attempts a Fallback dial-up connection. (The Fallback connection must be set up using **!MPFBSETUP**.) (This is the default.) • **<value>=1** **All services barred**—No connections are available. • **<value>=2** **Fallback connections barred**—GPRS connections are available; the Fallback connection is never attempted. • **<value>=3** **GPRS connections barred**—Any attempt to establish a connection invokes the Fallback connection. **!MPBARSVC?** returns the current setting.
!MPCFGDUMP? <batch>	**Dumps configuration** *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_3ap or later and on MP 775 GPS modems with firmware version R3_0_9ap or later.* Returns settings for all parameters of the AT commands that are used to configure the modem. The report lists each AT command followed by the setting of each parameter of the command. **Parameter settings** To return all configuration settings, you must run the command twice, with <batch> = 1 (to return the first batch of settings), then <batch> =2 (to return the second batch of settings).
!MPCLIENTIP?	**Report the IP address** Returns the client IP address assigned to the modem by the network. If there is no network connection, 0.0.0.0 is returned.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPCONFSNAP= <rnapport>, <rawgpsport, <vpnflag> **!MPCONFSNAP?**	**Configure UDP port number** Sets the port number on which the MP 700 Series GPS receives RNAP/UDP or raw-GPS/UDP packets and sets the VPN support flag. *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_1ap or later and on MP 775 GPS modems with firmware version R3_0_5ap or later. The <vpnflag> parameter is only supported with firmware version R3_0_7ap or later.* The parameters are: • **<rnapport>** The UDP port number used to listen for RNAP packets (1 - 65535). • **<rawgpsport>** The UDP port number used to listen for raw GPS (TAIP) messages (1 - 65535). • **<vpnflag>** Determines how RNAP data is routed. When disabled (**<vpnflag>=0**), RNAP data is encapsulated in UDP packets and sent to the GSM network. When enabled (**<vpnflag>=1**), RNAP data is sent to the host PC, so that it can be routed through a VPN client. The **!MPMTCONF** command sets whether raw GPS data or MTP data is sent. (The **<ctype>** parameter is used to make the setting. See page 50.) **!MPCONFSNAP?** returns the current ports.
!MPCONREJ= <max connect failures> **!MPCONREJ?**	**Enable/disable reset feature** *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_1ap or later and on MP 775 GPS modems with firmware version R3_0_5ap or later.* Enables and disables the feature that resets the modem after repeated connection attempts fail. The parameter **<max connect failures>** sets the number of consecutive connection attempt failures after which the MP 700 Series GPS gracefully shuts down, resetting the radio component. If the parameter is set to 0, the feature is disabled. (It is disabled by default.) As an example, the command **AT!MPCONREJ=3** configures the modem to automatically reset the radio component if three consecutive connection attempts fail. **!MPCONREJ?** returns the current setting.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPCWINFO=<reset> **!MPCWINFO?**	**Reset/Display Connection Watchdog statistics** *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_1ap or later and on MP 775 GPS modems with firmware version R3_0_5ap or later.* Displays and resets values related to the Connection Watchdog. (The Connection Watchdog is enabled, disabled, and configured with the command **!MPCWSETUP**. See page 36.) **Parameter settings** The only supported value for the **<reset>** parameter is "1", which causes a reset of the following statistics stored in non-volatile RAM: • **DNS checks** Number of times the modem verifies the DNS server • **CW-trig disconnect** Number of disconnections triggered by the Connection Watchdog • **CW-trig reset** Number of resets triggered by the Connection Watchdog. (The resets occur after a specified number of terminated connections.) **!MPCWINFO?** returns the current statistics.
!MPCWSETUP= <rxtime>, <dnstime>, <dnsport#>, <"dnsname">, <max number of CW-triggered disconnects>, <PING IP>, <mode>	**Set Connection Watchdog** *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_1ap or later and on MP 775 GPS modems with firmware version R3_0_5ap or later.* The Connection Watchdog monitors connections to determine whether the modem is receiving any data. If the modem is not receiving data, the Connection Watchdog either sends a DNS query to the DNS server or pings a specified IP address, depending on how the feature is configured. If data transmission is resumed following the DNS query or ping, the modem maintains the connection. Otherwise the modem terminates the connection. If the modem is in "always-on" mode, the modem attempts reconnection once the connection is terminated. (See **!MPOPMODE** on page 52.) This command also allows you to set the modem to either disconnect the data connection or reset the radio component whenever the Connection Watchdog has detected an invalid data connection. Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPCWSETUP (continued)	**Set Connection Watchdog (continued)** When a new connection is established, the modem verifies that the DNS server is valid or that pings are possible (depending on the **<mode>** setting), before the modem begins monitoring for data receipt. If the modem is unable to verify the DNS server or the ping fails, the Connection Watchdog remains inactive, but the modem continues to either ping or verify the DNS server at the interval set by the **<dnstime>** parameter. The parameters are: **<rxtime>** Interval (in minutes) at which the modem checks whether data is being received. When this interval is reached, depending on the **<mode>** setting, the modem either sends a DNS query or pings the address specified by the **<PING IP>** parameter. The allowed values are 0 to 240. When set to 0, the Connection Watchdog is disabled. (0 is the default.) **<dnstime>** Interval (in minutes) at which the modem checks for a DNS server or attempts a ping when a new connection is established. On MP 750 GPS modems with firmware version 2_1_11ap, and MP 775 GPS modems with firmware version 3_0_5ap, the allowed values are 0 to 240. On MP 750 GPS modems with firmware version 2_1_12ap or higher ,and MP 775 GPS modems with firmware version 3_0_7ap or higher, the allowed values are 1 to 240. (30 is the default.) **dnsport#** DNS port number used by the MP. The allowed values are 1 to 65535. The default is 7367. To avoid selecting a port number that is in use by another component, it is advisable to use the default port number. **dnsname** Website name for DNS to resolve (such as “www.sierrawireless.com”). (The maximum string length is 128 characters.) **AC Reset Flag** Flag that determines whether the radio component is reset when the Connection Watchdog determines that a connection has failed. When set to 0 (the default), the Connection Watchdog terminates invalid connections but does NOT perform a reset. When set to 1, the Connection Watchdog resets the radio component after terminating the connection. *Note: In firmware version 2_1_12ap on the MP 750 GPS, and firmware version 3_0_7ap on the MP 775 GPS, the **<AC Reset Flag>** parameter has replaced the **<max number of CW-triggered disconnects>** parameter that was in firmware versions 2_1_11ap and 3_0_5ap respectively. The **<max number of CW-triggered disconnects>** set the modem to reset the radio component after a specified number of consecutive Connection Watchdog-triggered disconnects. (The allowed values were 1 to 65535.)* Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPCWSETUP (continued)	**Set Connection Watchdog (continued)** **<PING IP>** IP address that the modem pings when the **<mode>** parameter is set to ping. The format is X.X.X.X where X is a value between 0 and 255. (The default is 0.0.0.0.) **<mode>** Action that the modem takes when the <rxtime> interval is reached; 0 = DNS query, 1 = ping. As an example, the following AT command would configure the modem to verify a DNS address when a connection is established: at!mpcwsetup=10,30,7367,"www.sierrawireless.com",0,0.0.0.0,0 In the above example: • Once a connection is established, the Connection Watchdog goes into "validating mode", and attempts to validate the DNS server. (<mode> = 0) • DNS validation is performed by looking up the domain name www.sierrawireless.com (<dnsname> = "www.sierrawireless.com") • If the DNS lookup fails, the modem remains in "validating mode", looking up the domain name every 30 minutes (<dnstime> = 30) • If the DNS lookup is successful, the Connection Watchdog goes into "monitoring mode". The modem checks the Rx byte count every 10 minutes (<rxtime> = 10). If the Rx byte count changes during the 10 minute interval, the connection is deemed to be valid. If the Rx byte count does not change, the modem generates traffic by performing a DNS look-up. If the Rx byte count changes as a result of the DNS look-up, the connection is deemed to be valid. Otherwise the connection is terminated. • The Connection Watchdog does NOT reset the modem after terminating an invalid connection in this example (<AC Reset Flag> = 0). If the <AC Reset Flag> were set to 1, the radio component would be reset after the modem terminated any invalid connection. As another example, the following AT command would configure the modem to ping a specified IP address when a connection is established: at!mpcwsetup=10,30,7367,"www.sierrawireless.com",0,100.101.102.103,1 In the above example: • Once a connection is established, the Connection Watchdog goes into "validating mode", and attempts to ping the server. (<mode> = 1) • DNS validation is performed by pinging the address 100.101.102.103 (<PING IP> = 100.101.102.103) • If the ping fails, the modem remains in "validating mode", looking up the domain name every 30 minutes (<dnstime> = 30) Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPCWSETUP (continued)	**Set Connection Watchdog (continued)** • If the ping is successful, the Connection Watchdog goes into "monitoring mode". The modem checks the Rx byte count every 10 minutes (<rxtime> = 10). If the Rx byte count changes during the 10 minute interval, the connection is deemed to be valid. If the Rx byte count does not change, the modem generates traffic by pinging the server. If the Rx byte count changes as a result of the DNS look-up, the connection is deemed to be valid. Otherwise the connection is terminated. • In this example, the Connection Watchdog does NOT reset the modem after terminating an invalid connection (<AC Reset Flag> = 0). If the <AC Reset Flag> were set to 1, the radio component would be reset after the modem terminated any invalid connection.
!MPDIO=<chan>,<value> **!MPDIO? <chan>**	**Set the value at a specified digital IO channel** The MP 700 Series GPS has four digital input/output channels, allowing digital sensors and gauges to be connected to the modem. All four channels can be used to provide input to the modem. Two of the four can be used alternatively to provide output from the modem. Sensors and gauges must be connected to the appropriate pins of the DB15 I/O connector. (See the *Software Installation, Configuration, and Integration Guide* on the MP 700 Series GPS installation CD for more information about configuring I/O devices.) The channels correspond to the pins as follows: • **<chan>=1** Digital I/O 1—Pin 3 • **<chan>=2** Digital input 2—Pin 4 • **<chan>=3** Digital I/O 3—Pin 11 • **<chan>=4** Digital input 4—Pin 12 Continued on next page.
!MPDIO (continued)	**Set the value at a specified digital IO channel (continued)** The initial configuration of the I/O channels must be done using the command **!MPDIOCFG**. Once configured, you can use **!MPDIO** to set the logic level for channels 1 and 3, if configured as outputs. (**!MPDIOCFG** could also be used for this purpose but would require that more parameters be entered.) **!MPDIO?** reports the logic level of all four channels, whether configured as inputs or outputs. The allowed **<value>** settings are **0** (logic level low) and **1** (logic level high).

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPDIOCFG= <chan>,<type>, "<IO label>", <alarm>, "<logic low label>", "<logic high label>", [<level>] **!MPDIOCFG? <chan>**	**Digital I/O channel configuration** Sets the type (input or output), labels, and alarm trigger, for the specified I/O channel. **Parameter settings** The supported values are: • Channel **<chan>=** 1 Digital I/O 1—Pin 3 (input or output) 2 Digital I/O 2—Pin 4 (input only) 3 Digital I/O 3—Pin 11 (input or output) 4 Digital I/O 4—Pin 12 (input only) • Input/output type **<type>=** 0 Input 1 Output (only valid for channel 1 and 3) • Sensor or gauge description **<IO label>=** 20 character string • Alarm trigger **<alarm>=** 0 No alarm; no logging 1 Alarm triggered (and event logged) when logic level low occurs 2 Alarm triggered (and event logged) when logic level high occurs 3 No alarm; any change in logic level is logged The name and location of the log file is set in Watcher. (See the Watcher online help for details.) • State when logic level is low **<logic low label>=** 20 character string • State when logic level is high **<logic high label>=** 20 character string • Output level **<level>=** This parameter is only valid for channels 1 and 3 and only where <type>=1. 0 Low 1 High **!MPDIOCFG?** returns the configuration values for the specified channel.
!MPFBKEND= <value> **!MPFBKEND?**	**Set response to GPRS re-acquisition** Determines how the modem behaves if GPRS service is re-acquired during a Fallback connection (See **!MPFBSETUP**.) The **<value>** setting determines whether the dial-up connection is maintained: • **<value>=0** Disconnect immediately • **<value>=1** Maintain dial-up connection (Default) (Disconnecting may save excess charges for dial-up services.) **!MPFBKEND?** returns the current setting.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPFBSETUP= <label>, <username>, <password>, <phone#> **!MPFBSETUP?**	**Configure the Fallback connection** The Fallback feature allows the MP 700 Series GPS to automatically establish a dial-up (circuit-switched) connection when GPRS service is lost during a connection. (Fallback is only useful in areas that have GSM but not GPRS coverage. See the *Software Installation, Configuration, and Integration Guide* on the MP 700 Series GPS CD for more information about this feature.) **!MPFBSETUP** sets up the dial-up connection invoked by the Fallback feature. These other commands affect the behavior of the feature: • **!MPFBTIME**—determines how long the modem waits between losing GPRS service and initiating the Fallback connection. • **!MPFBKEND**—determines how the modem behaves if GPRS service is re-acquired during a Fallback connection. • **!MPBARSVC**—enables and disables Fallback and GPRS connections (effectively enabling and disabling this feature). Fallback only works when the default GPRS profile is in use, and only where the network supports dial-up connections. **Parameter settings** The supported values are: • Connection description **<label>=** 32 character string • Username **<Username>=** 32 character string • Password **<Password>=** 32 character string • Phone number **<Phone#>=** 32 characters (0-9, #, *) **!MPFBSETUP?** returns the current configuration.
!MPFBTIME= <value> **!MPFBTIME?**	**Set Fallback timer** Sets the duration that the MP 700 Series GPS waits between losing GPRS service and initiating a Fallback connection. (See **!MPFBSETUP**.) The **<value>** is in seconds (minimum 0, maximum 300). (The default is 60.) **!MPFBTIME?** returns the current timer duration.
!MPGCCLR	**Clear crash dump data** When a crash occurs, data associated with the crash is written to a memory location on the modem. This command deletes the contents of that memory location. (See **!MPGCDUMP**.)

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPGCDUMP	**Read crash dump data** This command shows the contents of the memory location to which crash dump data is written. (See **!MPGCCLR**.) The memory location is overwritten whenever a crash occurs.
**!MPGPSCMD= <"TAIP command"> **	**Send TAIP command to GPS module** This command requires that the module be configured to use the TAIP protocol. (See **!MPGPSRESET**.) Note that TAIP commands use ">" as the start delimiter and "<" as the end delimiter. For example, to issue the TAIP command QST (which queries the operational status of the GPS module), you would enter: **AT!MPGPSCMD=">QST<"** For a listing of TAIP commands see the *TAIP Reference* on the Sierra Wireless web site (www.sierrawireless.com) or see the Trimble web site (www.trimble.com). (The GPS module in the modem is the SQ. If no documentation is available for the SQ, see the *SVeeEight Plus GPS System Designer Reference Manual*.)
!MPGPSCOMOUT= <enable>, <save to NV>	**Enable GPS output to the AT command port** This command is only available on modems with firmware version 2.0 or greater. When GPS output to the AT command port is enabled (the **<enable>** parameter is set to 1), the MP 750 GPS sends TAIP or NMEA data to the COM port. This might be used to provide data to a third-party "moving map" application. Setting the **<enable>** parameter to 0 stops the output. (The default is 0.) The **<save to NV>** parameter is used to specify whether the **<enable>** setting is saved to non-volatile memory. If the setting is saved to memory, it persists across power cycles. (The default is 0, where the <enable> setting is NOT saved to memory.) *Note: When GPS output to the AT command port is enabled, GPS output occurs until the DTR line is deasserted or TIES is issued, depending on the setting made using the command* **!MPGPSESC**. *(See page 45.)* Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPGPSCOMOUT (continued)	**Enable GPS output to the AT command port (continued)** The **<enable>** and **<save to NV>** parameters have this effect: **<enable>=0, <save to NV>=0** — GPS data is NOT sent to the COM port. When the modem is reset, GPS data will be sent or not, based on the previously saved <enable> setting. (If no setting has been previously saved, GPS data will NOT be sent to the COM port.) **<enable>=0, <save to NV>=1** — GPS data is NOT sent to the COM port. When the modem is reset, GPS data will NOT be sent. **<enable>=1, <save to NV>=0** — GPS data is sent to the COM port. When the modem is reset, GPS data will be sent or not, based on the previously saved <enable> setting. (If no setting has been previously saved, GPS data will NOT be sent to the COM port.) **<enable>=1, <save to NV>=1** — GPS data is sent to the COM port. When the modem is reset, GPS data will continue to be sent.
!MPGPSDATA?	**Report current GPS data** This returns a parsed string: **Valid Flag** — Used internally to verify data. **LED** — Status of the GPS LED on the front panel of the modem: 1 Off 2 On flashing 3 On solid **Receiver St1 & Receiver St2** — Status Byte 1 and Status Byte 2 As returned by the TAIP command, >QST<. The codes indicate the operational status of the GPS module. (TAIP command documentation is available on the Trimble and Sierra Wireless web sites. See **!MPGPSCMD**.) Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPGPSDATA? (continued)	**Report current GPS data (continued)** **Latitude** Latitude in this form:AB.C.D.E: A Direction (N=North, S=South, U=Unknown) B Degree C Minute D Second E Second (decimal place) **Longitude** Longitude in this form:AB.C.D.E: A Direction (E=East, W=West, U=Unknown) B Degree C Minute D Second E Second (decimal place) **Altitude** Altitude in meters (+ if above sea level and - if below.) **Horz Sp** Speed in kilometers per hour **Heading** Heading in degrees from True North (0) increasing clockwise **Num SV** Number of satellites fixed. (The modem must have a fix on at least four satellites to report longitude, latitude, heading, altitude, and speed. The maximum number of fixes is eight.) **Data Age** Used internally to determine validity of the data. **UTC Time** Universal Coordinated Time (the time and date in Greenwich, England) in the format: H:M:S:D:MO:Y:OF:FLAG H Hours M Minutes S Seconds D Day MO Month Y Year OF GPS Time Offset (Difference between GPS and UTC time standards) **FLAG GPS Time Offset Flag** (1=valid and 0=invalid)

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPGPSESC= <escape> **!MPGPSESC?**	**Set method of escaping from GPS output mode to AT command mode** Sets the method of switching from GPS output mode (in which TAIP or NMEA data is sent directly the COM port) to using the COM port to issue AT commands. (See **!MPGPSCOMOUT** on page 29 for an explanation of how to enable the GPS output and how to save that setting to memory.) *Note: This command is only available on modems with firmware version 2.0 or greater.* The **<escape>** parameter is used to set whether GPS output is terminated by deasserting DTR or by issuing TIES: • **<escape>=0** deasserting DTR *(default)* • **<escape>=1** issuing TIES • **<escape>=2** either deasserting DTR or issuing TIES TIES (Time Independent Escape Sequence) consists of sending the string "AT+++". (The "AT" must be in upper case). See page 16. The setting made with this command persists across power cycles. **!MPGPSESC?** returns the current setting.
!MPGPSINIT=<init no>, <"TAIP command">	**Set initialization string** Specifies TAIP commands to be executed by the modem on start-up. (This can be used, for example, to set up the automatic reports.) Up to five commands can be configured to execute during initialization. The maximum length of the initialization string is 128 characters. The **<init no>** designates the order in which commands are executed (1=first; 5=last). The command **!MPGPSST?** allows you to query the current initalization strings. (See page 47.)
!MPGPSINTSET= <update interval> **!MPGPSINTSET?**	**Set GPS update interval** Sets the interval at which the GPS module does position and altitude readings. This does not control the frequency at which this data is reported (which is controlled by the **!MPMTCONF** command.) The **<update interval>** is in seconds (minimum 0, maximum 255). The default is 1. **!MPGPSINTSET?** returns the current update interval.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPGPSNMEA= [<RMC>],[<GGA>], [<GLL>],[<VTG>], [<GSV>],[<GSA>], [<ZDA>] **!MPGPSNMEA?**	**Set NMEA messages** Sets which NMEA messages are generated by the GPS module when in NMEA mode. (See **!MPGPSRESET**.) *Note: This command is only available on modems with firmware version 2.0 or greater.* The NMEA protocol includes several different message types, of which these are supported. **GGA**—Global positioning system fix data **GLL**—Global position / latitude and longitude **GSA**—GPS DOP (Dilution of Precision) and active satellites **GSV**—Satellites in view **RMC**—Recommended minimum specific GPS/transit data **VTG**—Track made good and ground speed **ZDA**—Time and date To enable a message, set the parameter to “1”; to disable, set the parameter to “0”. For example: **<GGA>=0** disables the Global positioning system fix data message **<GGA>=1** enables the Global positioning system fix data message Messages are separated by <LF><CR>. By default, the **GGA**, **VTG**, and **ZDA** messages are generated, and these three messages must be enabled in order for Watcher to display GPS information. See the NMEA web site, www.nmea.org to obtain the standards documents that provide the message formats. **!MPGPSNMEA?** returns the setting, showing which messages are currently enabled.
!MPGPSRESET=[<protocol>]	**Reset GPS module** The MP 700 Series GPS has an embedded Trimble SQ GPS module.The module supports TAIP/TSIP (Trimble ASCII Interface Protocol/Trimble Standard Interface Protocol) and NMEA (National Marine Electronics Association). **!MPGPSRESET** restarts the GPS module setting the protocol. The **<protocol>** value determines the protocol in use following the reset: • **<protocol>=0** TAIP *(default)* • **<protocol>=1** NMEA

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPGPSST?	**Request GPS status** This returns a parsed string: **State** State of the GPS module: 0 Idle 1 Booting up; sending configuration sequence 2 Active 3 Sent remote command; waiting for acknowledgement 4 Sending command sequence (TAIP command) 5 Waiting for results from query command 6 Resetting; waiting for reset timer to expire **Recv Drop** Number of packets lost because the buffer space was exceeded (0-255) **Recv Len Drop** Number of messages lost because the message length was exceeded (0-255) **Max Rx Buf Used** Maximum number of buffers used (0-255) **Reset Cnt** Number of resets that occurred due to a lack of response from the GPS module (0-255) **Protocol** Navigation protocol in use: 0 TAIP 1 NMEA 2 TSIP (for diagnostic use only) **InitBaudRate** Baud rate (4800 or 9600) **localUpdateInt** Local GPS query interval in seconds (0-255) **rmFlag** Bit-mapped storage of the flags set using the >SRM< TAIP command: Bit 0 ID_FLAG: 0=TRUE; 1=FALSE Bit 1 CS_FLAG: 0=TRUE; 1=FALSE Bit 2 EC_FLAG: 0=TRUE; 1=FALSE Bit 3 FR_FLAG: 0=TRUE; 1=FALSE Bit 4 CR_FLAG: 0=TRUE; 1=FALSE **Init Str 1:** First TAIP initialization string executed with the GPS module is powered or reset (Maximum length 128 characters) **Init Str 2:** Second TAIP initialization string executed with the GPS module is powered or reset (Maximum length 128 characters) **Init Str 3** Third TAIP initialization string executed with the GPS module is powered or reset (Maximum length 128 characters) **Init Str 4** Fourth TAIP initialization string executed with the GPS module is powered or reset (Maximum length 128 characters) **Init Str 5** Fifth TAIP initialization string executed with the GPS module is powered or reset (Maximum length 128 characters)

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPGPSSTOR= <#GPSrecords> **!MPGPSSTOR?**	**Enable / disable storing and forwarding of GPS records** *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_1ap or later and on MP 775 GPS modems with firmware version R3_0_5ap or later.* GPS records (TAIP or NMEA) can be stored on the modem when the modem is out of GSM coverage and automatically forwarded when GSM coverage is re-acquired. The parameter **<#GPSrecords>** sets the total number of records the modem accumulates while out of coverage (maximum 1000). When this number is reached, the modem discards the oldest record as each new record is captured so that the stored records are the most recent. The feature is disabled when **<#GPSrecords>** is set to 0. **!MPGPSSTOR?** returns the current setting, showing how many records are being stored.
!MPGPSTAIP=<LN>, <PV>, <CP>, <AL>,<ST> **!MPGPSTAIP?**	**Set / query TAIP messages sent in RNAP** *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_7ap or later and on MP 775 GPS modems with firmware version R3_1_2ap or later.* This command requires that the module be configured to use the TAIP protocol. (See **!MPGPSRESET**.) GPS data sent from the MP 700 Series GPS is framed according to a proprietary protocol called RNAP. (RNAP is described in the *Software Installation, Configuration, and Integration Guide* available on the CD that came with your modem, and on the Sierra Wireless web site, www.sierrawireless.com.) Unless the modem is configured to use NMEA, GPS data is sent in the form of TAIP messages which are embedded in the RNAP messages. Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPGPSTAIP (continued)	**Set / query TAIP messages sent in RNAP (continued)** This command allows you to specify which of the following TAIP messages are sent: • LN—Long navigation message • PV—Position / velocity solution • CP—Compact position solution • AL—Altitude / vertical velocity • ST—Status The *TAIP Reference* on the Sierra Wireless web site describes these messages in detail. **Parameter settings** For each parameter (<LN>, <PV>, <CP>, <AL>, <ST>), a setting of 1 enables the message (includes it in the RNAP mesage) and a setting of 0 disables the message. By default, only <LN> is enabled. **!MPGPSTAIP?** returns the current settings, showing which messages are enabled.
!MPGPSTRACK= <track> **!MPGPSTRACK?**	**Set / query GPS tracking for MT reporting** *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_7ap or later and on MP 775 GPS modems with firmware version R3_1_2ap or later.* Allows you to suppress MT messages from being sent when the GPS module does not have a fix on enough satellites to calculate its position. This command only has effect when the MP is in non-polling mode (that is, the last parameter of the **!MPMTCONF** command is set to zero). In this mode, the GPS module must be configured for frequency or distance reporting in order for GPS reports to be issued by the GPS module.) When the <track> parameter is set to 0, all GPS messages are forwarded, regardless of whether the message contains valid GPS data. When the <track> parameter is set to 1, GPS messages are only forwarded if the GPS module is able to calculate a position. (The module must have a fix on three satellites to calculate latitude and longitude.) **!MPGPSTRACK?** returns the current setting of the <track> parameter.
!MPGRESET	**Reset the MP and the PC Card module** Generates a hard reset of the modem (the equivalent of powering down then powering up).
!MPGVER?	**Query current firmware revision** Returns a text string identifying the current firmware revision of the PC Card module.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPIDTIME= <value> **!MPIDTIME?**	**Sets the inactivity timeout** Sets the interval after which a connection is lost if no data transmission occurs. This applies only if the operating mode is “On demand”. (See **!MPOPMODE**.) This timeout has no effect during PAD sessions. (The PAD has its own inactivity timer. See **!MPPADCONF**.) The **<value>** is in seconds (minimum 1, maximum 3600). The default is 2.
!MPIGNSENSE?	**Report ignition status** The white wire of the power harness is the ignition sense. The modem powers on when this wire is pulled high. (See the *Installation in Vehicles Guide* on the MP 700 Series GPS CD.) **!MPIGNSENSE?** returns either: • **0** Off—ignition sense is pulled low (less than 2 V) • **1** On—ignition sense is pulled high (5 to 36 V)
!MPMTCONF= <engid>, <ctype>, <destip>, <destport>, <lowtmr>, <fasttmr>, <gpstmr> **!MPMTCONF? <n>**	**Configure MT protocol** A proprietary protocol called “MT” is used to report the GPS and I/O data from the modem. (“MT” is for “Monitoring and Tracking”. The protocol defines the contents and format of the reported data.) The *Software Installation, Configuration, and Integration Guide* on the installation CD provides a description of this protocol. The modem provides four independent reporting engines, allowing the MT data to be simultaneously sent to four different destinations. The **!MPMTCONF** command sets the destination addresses, port numbers, and timers for each of the four engines. Three timers control how frequently MT reports are sent: the low rate timer, the high rate timer, and the GPS timer. Each of these timers can be set to send reports at a different frequency. The high rate timer only becomes active when an alarm condition is triggered by a rise or drop in the level of one of the digital I/O channels. (The **!MPDIOCFG** command controls the alarm triggers on the digital I/O channels.) When there is no active alarm, the low rate timer and GPS timer determine the frequency of the reports. Where both timers are enabled, the timer with the shortest interval controls the report frequency. The GPS timer (which is in seconds) is generally set to a shorter interval than the low rate timer (which is in minutes). (Having the two timers allows for a system that reports data more frequently in certain conditions. For example, the GPS timer can be disabled when the vehicle is stationary and enabled when the vehicle is moving.) Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPMTCONF (continued) **!MPMTCONF? <n>**	**Configure MT protocol (continued)** **Parameter settings** The supported values are: • Reporting engine **<engid>=** 0 Engine 0 1 Engine 1 2 Engine 2 3 Engine 3 • Connection type **<ctype>=** 0 Engine is unused 1 MTP embedded in UDP packets 2 Unused 3) Raw GPS data embedded in UDP packets Setting <ctype> to 0 disables the engine. • Destination address **<destip>=** IP address (in the form, nnn.nnn.nnn.nnn) of the destination device. • Destination port number **<destport>=** 1 - 65535 • Low rate timer **<lowtmr>=** 0 Disabled 1-255 Interval between reports in minutes (5 by default.) • Fast rate timer **<fasttmr>=** 0 Disabled 2-30 Interval between reports in seconds (3 by default.) • GPS timer **<gpstmr>=** 0 Disabled 1-255 Interval between reports in seconds (10 by default.) When the GPS timer is disabled, the module continues to send unsolicited reports. **!MPMTCONF?<n>** returns the configuration settings for the engine as specified by <n> (where <n> is 0, 1, 2, or 3)
!MPNVDEF	**Set modem configuration parameters to defaults** Resets parameters stored in non-volative memory to defaults. This includes configuration settings for GPS, I/O, MTP, Fallback, Connection Watchdog, Operating Mode, PAD, and USB.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPOPMODE= <value> **!MPOPMODE?**	**Select operating mode** The MP 700 Series GPS has two operating modes: Always On and On Demand. The mode selection determines whether the modem establishes a *modem-to-GPRS* connection in the absence of a *host-to-modem* connection. If there is a *modem-to-GPRS* connection, but no *host-to-modem* connection, the MP 700 Series GPS can send GPS data and provide notification on the state of any connected sensors or gauges. The *host-to-modem* connection is required if the user wants to web browse or send or receive messages. • **Always On**—the modem establishes a *modem-to-GPRS* connection whenever GPRS service is acquired. The connection is only terminated when GPRS service is lost or the modem powered down. • **On Demand**—the modem establishes a network connection only when a connect request is made (by an AT command or from an application such as Watcher). That is, the *modem-to-GPRS* connection is established only when the *host-to-modem* connection is requested. When the host disconnects, the *modem-to GPRS* connection is lost as soon as the inactivity timer expires. (See **!MPIDTIME**.) The **<value>** is either: • **<value>=0** Always On • **<value>=1** On Demand The setting is maintained across power cycles. **!MPOPMODE?** returns the operating mode.
!MPPADCONF= <idle>,<c2c>, <ties>,<fwden>, <fwdchar>, <thre>,<echo>, <edit>,<bs> **!MPPADCON?**	**PAD configuration** Controls how packets are assembled, how PAD sessions are terminated, and whether echoing and buffer editing are enabled or disabled. *Note: The MP 700 Series GPS source port number is hard coded and is 7238. This port number should be used as the destination UDP port number by a remote host sending PAD data to the modem.* The PAD assembles and sends a packet to the network when any of the following occur: • The maximum packet length is reached (as defined by the **<thre>** parameter). • The Inter-character timeout expires, (if enabled by the **<c2c>** parameter). • The forwarding character is received, as defined by the **<fwdchar>** parameter, if enabled by the **<fwden>** parameter. Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPPADCONF= (continued) **!MPPADCONF?**	**PAD configuration (continued)** • Escape option **<escape>=** When exchanging binary data, it is best to use option 3 or 4 so that TIES (Time Independent Escape Sequence) is disabled. (Otherwise, if the string "AT+++" occurs in the data, it will cause the modem to switch to command mode.) 0 TIES—the modem switches to command mode on receipt of the sequence: "AT+++". 1 TIES and DTR option 1— the modem switches to command mode on receipt of the sequence, "AT+++", or, when the DTR line switches from on to off (maintaining any connected call). 2 TIES and DTR option 2— the modem switches to command mode on receipt of the sequence, "AT+++", or, when the DTR line switches from on to off (terminating any connected call). 3 DTR option 1—the modem switches to command mode only when the DTR line switches from on to off (maintaining any connected call). 4 DTR option 2—the modem switches to command mode only when the DTR line switches from on to off (terminating any connected call). NOTE: When switching to command mode during a PAD session using "AT+++" , the "AT" must be included and must be in upper case. When command mode is invoked in this way, The PAD session remains open. The command "ATO" can then be used to resume the PAD session. The command "ATH" will close the PAD session. • Include/exclude forwarding character **<fwden>=** 0 Disabled 1 On receipt of the primary forwarding character, PAD sends the packet, including the primary forwarding character, and terminates the session. 2 On receipt of the primary forwarding character, PAD forwards the packet, *without* including the primary forwarding character, and terminates the session. • Forwarding character **<fwdchar>=** ASCII code (0-255) for the forwarding character (by default, 13 or <CR>). • Maximum packet length **<thre>=** Length in bytes (minimum 1, maximum 1460). The default is 1460. • Enable/disable echo **<echo>=** 0 Disabled 1 Enabled When enabled, the PAD echoes every character received from the host. If input buffer editing is also enabled, on receipt of the backspace character, the PAD echoes the following:<backspace character><space><backspace character>. (The backspace character is defined using the <bs> parameter.) • Input buffer editing **<edit>=** 0 Disabled 1 Enabled When enabled, the PAD removes the last character from the input buffer on receipt of the backspace character. (The backspace character is defined using the <bs> parameter.) • Input buffer backspace character **<bs>=** ASCII code (0-255) for the backspace character (by default, 8, <BS>). **!MPPADCONF?** returns the current PAD configuration.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPPADCONN[n]	**Establish PAD connection** Initiates the PAD connection defined by the **!MPPADSETUP** command using the configuration specified by the **!MPPADCONF** command. *Note: The MP 700 Series GPS source port number is hard coded and is 7238. This port number should be used as the destination UDP port number by a remote host sending PAD data to the modem.* The GPRS profile used in the connection is specified by **n**: • **<n>=1** Profile 1 • **<n>=2** Profile 2 • **<n>=3** Profile 3 Profiles are defined using the **!MPSETUP** command. If **n** is not specified, the default profile is used. The default is defined by the **!MPSETDFLT** command.
!MPPADSETUP=<ctype>, <ipaddr>, <port#>, <autoconn> **!MPPADSETUP?**	**Set up a PAD connection** Creates a UDP or TCP connection with a specified device. This defines the connection established by the **!MPPADCONN** command. *Note: The MP 700 Series GPS source port number is hard coded and is 7238. This port number should be used as the destination UDP port number by a remote host sending PAD data to the modem.* **Parameter settings** The supported values are: • Connection type **<ctype>=** 0 Undefined 1 UDP 2 TCP No data communication is possible when <ctype>=0. • Destination IP address **<IP address>=** IP address (in the form, nnn.nnn.nnn.nnn) of the destination device. • Destination port number **<port#>=** 1 - 65535 • Autoconnection option **<autoconn>=** 0 Disabled *(default)* 1 Enabled When enabled, the modem initiates a connection to the specified destination address and port on power-up. **!MPPADSETUP?** returns the PAD connection setup.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPPDDELAY= <value> **!MPPDDELAY? [<querytype>]**	**Set power down timer** Sets the length of a timer that begins counting down when the power is removed or the ignition sense wire is pulled low. (See **!MPIGNSENSE**.) The MP 700 Series GPS powers down when the timer expires. The **<value>** is in minutes (minimum 0, maximum 240). (The default is 0.) Depending on the **<querytype>**, **!MPPDDELAY?** returns: • **<querytype>=0** Length of the timer *(default)* • **<querytype>=1** Time remaining before expiry
!MPPRIVIP= <IP addr>, <local port>, <host port> **!MPPRIVIP?**	**Set the private IP address** The private IP is used for data traffic between the MP and Watcher, to distinguish control and status messages from network traffic. Any valid private IP address can be used. Using a pubic IP address could cause the application to fail. **Parameter settings** The parameters are: • **<IP addr>** The IP address used between Watcher and the MP 700 Series GPS (not used for network traffic). • **<local port>** Number of the port on which the MP 700 Series GPS receives control and status messages • **<host port>** Number of the port to which the MP 700 Series GPS sends control and status data **!MPPRIVIP?** returns the current private IP address. The default is 10.0.0.1
!MPSETDFLT= <value>	**Set the default GPRS profile** The MP 700 Series GPS allows for three profiles. This sets which is the default: • **<value>=1** Profile 1 is the default • **<value>=2** Profile 2 is the default • **<value>=3** Profile 3 is the default As shipped, the default profile is Profile 1. The default profile is the one used to establish a GPRS connection unless the user explicitly selects a different profile.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPSETUP= <index>,<label>, <username>, <password>, <apn>	**Configure a GPRS profile** The MP 700 Series GPS allows for up to three GPRS profiles. See the *Software Installation, Configuration, and Integration Guide* on the MP 700 Series GPS CD for more detailed information about profiles. (The username, password, and APN should be obtained from your service provider.) **Parameter settings** The supported values are: • Profile number **<index>=** 1 Profile 1 2 Profile 2 3 Profile 3 • Description of profile **<label>=** 32 character string • Username **<username>=** 32 character string • Password **<password>=** 32 character string • Access Point Name **<apn>=** 100 character string Unless the user explicitly selects a different profile, the default profile is used to establish GPRS connections. (See **!MPSETDFLT** above.)
!MPSIMSLED?	**Report the status of the SIM sled** The status returned is either: • **0** Closed—the sled is fully inserted • **1** Open—the sled is not fully inserted (This does not indicate whether there is a SIM in the sled.)

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPUSB=<n> **!MPUSB?**	**Enable / disable USB operation** This command is only available on modems with firmware version 2.0 or greater. The MP 750 GPS can be connected to the host PC with either a serial or USB cable. If only a serial cable is in use, this command has no effect. If a USB cable is in use, this command enables and disables USB operation, as specified by **<n>**: • **<n>=1** Enables USB operation (default) • **<n>=0** Disables USB operation If the modem is attached to the host PC by USB cable (or by both a USB and serial cable), USB operation must be disabled to allow for a DUN (Dial-Up Networking) connection using **ATD**. (**ATD** is described on page 100.) The modem must be reset before the command takes effect. (The modem can be reset using the reset button or the **!MPGRESET** command.) **!MPUSB?** returns the current USB state.
!MPWATCHER=<LAN>, <NAT> !MPWATCHER?	**Enable / disable NAT support** *Note: This command is only available on MP 750 GPS modems with firmware version R2_2_5ap or later and on MP 775 GPS modems with firmware version R3_1_0ap or later.* NAT support is required where the MP 750 GPS and the host PC (running Watcher) are connected to a router, and where the router uses Network Address Translation (NAT) on the UDP port address. (That is, “port address translation” NATing.) This command enables and disables the NAT flag. When enabled the MP 750 GPS uses the source UDP port number of incoming IP/UDP packets as the destination UDP port when replying to requests from the host. (When the NAT flag is disabled, the MP 750 GPS uses the UDP port address that is set using the **!MPPRIVIP** command. See page 55.) Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
!MPWATCHER (continued)	**Enable / disable NAT support (continued)** This command also sets a LAN flag used only for testing. This flag only has effect when the host PC is connected to the MP 750 GPS by a USB cable. When enabled, control and status messages are encapsulated in IP/UDP packets. This is disabled by default and should only be enabled on the advice of Sierra Wireless support staff. Parameter settings The **<LAN>** parameter has these allowed values: • **<LAN> = 0** Disables LAN flag (default and recommended setting) • **<LAN>=1** Enables LAN flag The **<NAT>** parameter has these allowed values: • **<NAT>=0** Disables NAT flag (default) • **<NAT>=1** Enables NAT flag **!MPWATCHER?** returns the current settings for the <LAN> and <NAT> flags.
&C<n>	**Data carrier detect (DCD) options** Determines the behavior of the data carrier detect (DCD) line. The DCD line switches on and off based on the value of **<n>**: • **<n>=0:** The DCD control line remains ON regardless of the status of the data carrier. • **<n>=1:** The DCD control line switches ON when there is a connection and OFF when there is no connection.
&D<n>	**Data terminal ready (DTR) options** Determines how the modem responds when the data terminal ready (DTR) line switches from ON to OFF. Based on the value of **<n>**, when the DTR line switches from on to off, the modem: • **<n>=0**Ignores the DTR status. • **<n>=1**Switches to command state while maintaining any connected call. • **<n>=2**Disconnects any active call and changes to command state.
&F[0]	**Reset modem to factory default** Resets the modem to the default configuration specified at the factory. (See “Factory Default Settings” on page 107.) The command may be issued as either **AT&F** or **AT&F0.**
&V	**Display current modem configuration** The modem returns its current configuration settings. On power-up or reset, these settings are either the factory default settings profile (see page 107) or the settings previously stored with the **AT&W** command.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
&W	**Store user-defined profile** Saves current configuration settings into non-volatile memory. When the modem is reset or powered off and on, these settings are restored. This only saves settings configured with these commands: **ATE**, **ATV**, **ATQ**, **ATL**, **ATM**, **ATX**, and **AT&C**. The settings stored using **AT&W** can also be restored using the **ATZ** command (see page 103). The **AT&F** command (see page 58) returns the modem to the factory default settings (see page 107).
+CBST=<speed>[,<name>][,<ce>] **+CBST?** **+CBST=?**	**Select bearer service type** Sets the data rate **<speed>**, bearer service **<name>**, and connection element **<ce>** to be used when originating a GSM data call. The query command **+CBST?** returns current values; **+CBST=?** returns supported values. **Supported values** Available values are: • data rate **<speed>=** 0 autobauding (automatic data rate selection) 1 300 bps (V.21) 2 1200 bps (V.22) 3 1200/75 bps (V.23) 4 2400 bps (V.22bis) 5 2400 bps (V.26ter) 6 4800 bps (V.32) 7 9600 bps (V.32) 12 9600 bps (V.34) 14 14400 bps (V.34) 65 300 bps (V.110) 66 1200 bps (V.110) 68 2400 bps (V.110/X.31) 70 4800 bps (V.110/X.31) 71 9600 bps (V.110/X.31) 75 14400 bps (V.110/X.31) • bearer service **<name>=** 0 data circuit asynchronous (UDI or 3.1 kHz modem) 2 PAD Access (asynchronous) (UDI) • connection element **<ce>=** 0 transparent 1 non-transparent

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CCFC=<reas>, <mode> [,<number>] [,<type>] [,<class>] [,<subaddr> [,<satype>] [,<time>] **+CCFC=?**	**Call forwarding number and conditions** Controls the call forwarding features of the modem, if available on the GSM network and supported by the user's carrier and subscrtion plan. The command supports registration, erasure, activation, deactivation, and status queries for call forwarding. *Note: When* **<mode>=0**, **1**, **2**, *or* **4**, *only* **<reas>** *and* **<mode>** *parameters are supported.* For all values of **<mode>** other than 2, the set command returns a simple OK (or an error message). When **<mode>=2** and **<reas>=0**, **1**, **2**, or **3**, for registered call-forward numbers, it returns a status line for each class: +CCFC: <status>,<class>,<number>,<type>,<time> +CCFC: <status>,<class>,<number>,<type>,<time> [etc.] For **<mode>=2**, if no call forward numbers are registered (i.e. no classes are active), it returns <status>=0 and <class>=7, which represents inactive status for all classes. +CCFC: 0,7 **+CCFC=?** returns a list of supported values for **<reas>**. **Supported values** **<reas>** can be one of six values: • **0** unconditional • **1** mobile busy • **2** no reply • **3** not reachable • **4** all call forwarding (0-3) • **5** all conditional call forwarding (1-3) **<mode>** can be one of five values: • **0** disable • **1** enable • **2** query status • **3** registration • **4** erase **<number>** is the string-type phone number of the forwarding address in the format specified by **<type>**. **<type>** is the type of address in integer format. The default is **<type>=145** when the dialing string includes the international access code character +, otherwise it is **<type>=129**. Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CCFC (continued)	**Call forwarding number and conditions (continued)** **<subaddr>** is a string-type subaddress of the format specified by **<satype>**. **<satype>** is the type of subaddress in integer format. The default is **<satype>=128**. **<class>** can be one of four values: • **1** voice • **2** data • **7** all classes *(default)* **<time>** is the time between 1 and 30 seconds, rounded to a multiple of 5 seconds. The default is 20 seconds. <status> is only returned, and can be one of two values: • 0 inactive • 1 active
+CCWA[=<n>] [,<mode>] [,<class>] **+CCWA?**	**Call waiting control** Controls the call waiting features of the modem, if available on the GSM network and supported by the user's carrier and subscription plan. The command can activate, deactivate, and query the call waiting service. For all values of **<mode>** other than 2, the set command returns a simple OK (or an error message). When **<mode>=2**, the modem returns a status line for each class: +CCWA:<status>,<class> +CCWA:<status>,<class> [etc.] **+CCWA?** returns the current value of **<n>**. **Supported values** **<n>** can be one of two values: • **0** disable presentation of an unsolicited result code *(default)* • **1** enable presentation of an unsolicited result code **<mode>** can be one of three values: • **0** disable • **1** enable • **2** query status *Note: If no* **<mode>** *value is provided, the network is not interrogated.* Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CCWA (continued)	**Call waiting control (continued)** **<class>** is a sum of integers each representing a class of information: • **1** voice • **2** data • **7** all classes *(default)* <status> is only returned, and can be one of two values: • 0 inactive • 1 active
+CEER	**Extended error report** A standard GSM command that returns a line of text information reporting the reason for: • the last unsuccessful call setup (originating or answering) or modification. • the last call release. • the last unsuccessful GPRS attach or unsuccessful PDP context activation. • the last GPRS detach or PDP context deactivation. Extended error reports are available for a number of the commands listed in this section, and appear in the form: +CEER: <report>
+CFUN=<fun>, <rst> **+CFUN?**	**Set phone functionality** Shuts down and starts up the modem. **Supported values** **<fun>** can be one of two values: • **0** shuts down the modem (without powering down) • **1** starts up the modem *(default)* **<rst>** can be one of two values: • **0** does not reset the modem on shut down / start up • **1** resets the modem on shut down / start up **+CFUN?** returns the current state of the modem (“0” if the modem is shut down, or “1” if the modem is fully functional.)

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGACT=<state>,<cid> **+CGACT?** **+CGACT=?** *Note: The Sierra Wireless modem permits only one PDP context to be active at a time.*	**GPRS PDP context activation/deactivation** In GPRS packet data mode, the **+CGACT** command activates (**<state>=1**) or deactivates (**<state>=0**) the specified Packet Data Protocol (PDP) context, then returns the modem to command state. **<cid>** (the PDP Context Identifier) is a numeric parameter which specifies a particular PDP context definition. **+CGACT=?** returns the permitted values. (See also +CGPADDR on page 70.) **Details** • If the specified PDP context is already in the requested state, the state for that context remains unchanged. • If the requested state cannot be achieved, the modem returns an error. (Extended error responses are enabled by the **+CMEE** command, page 76.) • If the modem is not GPRS-attached when instructed to activate, it attempts to perform a GPRS attach first. (See page 63.) • If no **<cid>** is specified, the command either activates the default PDP context, or deactivates the active one, as appropriate. • **+CGACT?** returns the current activation state for the PDP context, while **+CGACT=?** requests information on the supported PDP context activation states.
+CGATT=<state> **+CGATT?**	**GPRS attach or detach** Attaches or detaches the Sierra Wireless modem from the GPRS network: • **<state>=0** detaches from the GPRS network. • **<state>=1** attaches to the GPRS network. Any other values return an error. **Details** • If the modem is already in the requested state, the command is ignored and the modem returns an OK response. • Any active PDP contexts are deactivated before detaching from the GPRS network. • The **+CGATT?** command returns the current GPRS-attach state of the modem.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGCLASS= <class> **+CGCLASS?** **+CGCLASS=?**	**GPRS mobile station class** The Sierra Wireless modem operates only as a Class B device. (That is, it can be simultaneously attached to GSM and GPRS and can transmit voice or data.) This command exists to query the device and to conform to GSM/GPRS specifications, but only one set value is supported. Any attempt to set any class other than **B** returns an error. **+CGCLASS?** returns the current class of the modem, while **+CGCLASS=?** returns the supported class value. **Supported values** The available class setting is: • **<class>=B** Class B
+CGDATA [=<L2P>][,<cid>] *Note: Since the* **+CGDATA** *command enters data state, any other commands in the AT command line are not processed.* *Note: The Sierra Wireless modem permits only one PDP context to be active at a time.*	**Enter data state** Attempts a GPRS attach and PDP context activation. If successful, the modem returns CONNECT and enters the online data state. (The **D** command can also operate in a similar fashion. See “Make GPRS connection” on page 25.) GPRS attachment and PDP context activation procedures may take place prior to or during the PDP startup if they have not already been performed using the **+CGACT** and **+CGATT** commands (pages 63 and 63). If the activation is successful, data transfer may proceed. After data transfer is complete, and the layer 2 protocol termination procedure has completed successfully, the modem re-enters command state and returns the final result code OK. If there is an error, the V.25ter command state is re-entered and the modem returns the final result code NO CARRIER or, if enabled, +CME ERROR. Attach, activate and other errors may be reported. **+CGDATA=?** returns information on the supported layer 2 protocol. **Supported values** • The Sierra Wireless modem supports only IP PDP, so the only supported layer 2 protocol value of **<L2P>** is **PPP**. Other values will return an error. If context activation takes place during the PDP startup, a context ID **<cid>** may be specified in order to provide the information needed for the context activation request (see **+CGDCONT**, page 65). If no **<cid>** is given or if there is no matching context definition, the modem will attempt to activate the context with default values.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGDCONT= <cid> [,<PDP_type>] [,<APN>] [,<PDP_addr>] [,<data_comp>] [,<head_comp>] **+CGDCONT?** **+CGDCONT=?**	**Define Packet Data Protocol (PDP) context** Specifies PDP context parameter values for a PDP context identified by the local context identification parameter, **<cid>**. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by **+CGDCONT=?**. *Note: The **D****## command (used to establish GPRS connections) uses only those settings assigned to the PDP Context Identifier 1 (that is, <cid>=1).* *Note: A special form of the set command, **+CGDCONT= <cid>** causes the values for context number **<cid>** to become undefined.* **+CGDCONT?** returns the current settings for each defined context, while **+CGDCONT=?** returns values supported as a compound value. (The parameter value ranges for each <PDP_type> are returned on a separate line.) *Note: The Sierra Wireless modem supports only one active PDP context at a time.* **Supported values** The set command specifies a number of parameters: **<cid>** (PDP Context Identifier) is a numeric parameter which specifies a particular PDP context definition. The range of permitted values (minimum value = 1) is returned by **+CGDCONT=?**. (See also +CGPADDR on page 70.) **<PDP_type>** (Packet Data Protocol type) is a string parameter which specifies the type of packet data protocol. Only the IP context is supported: • **<PDP_type>=IP** Internet Protocol (IETF STD 5) **<APN>** (Access Point Name) is a string parameter used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested. **<PDP_address>** is a string parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the computer during the PDP startup procedure or, failing that, a dynamic address will be requested. **+CGDCONT?** returns the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the +CGPADDR command (page 70). **<data_comp>** is a numeric parameter that controls V.42*bis* PDP data compression, **0** for off, **1** for on. **<head_comp>** is a numeric parameter that controls PDP header compression, **0** for off, **1** for on.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGEQMIN=[<cid> [,<Traffic class> [,<Maximum bitrate UL>] [,Maximum bitrate DL>] [,Guaranteed bitrate UL>] [,Guaranteed bitrate DL>] [,Delivery order>] [,Maximum SDU size>] [,SDU error ratio>] [,Residual bit error ratio>] [,<Delivery of erroneous SDUs>] [,<Transfer delay>] [, <Traffic handling priority>] **+CGEQMIN?** **+CGEQMIN=?** *Note: This command is only available on the AirCard 775. On other products use the command, +CGQMIN, described on page 70.*	**Set or Query Minimum Quality of Service Profile** Specifies a minimum acceptable Quality of Service (QoS) profile for the specified local context identification parameter **<cid>**. (See pages 65 and 70 for more information.) The modem checks this profile against the negotiated profile returned in the Activate PDP Context Accept message. If the negotiated profile does not meet the minimum, the modem ends the data session. *Note: The **D**##* command (used to establish GPRS connections) uses only those settings assigned to the PDP Context Identifier 1 (that is, <cid>=1).* *Note: A special form of the set command, **+CGEQMIN= <cid>**, causes the minimum acceptable profile for context number **<cid>** to become undefined. In this case no check is made against the negotiated profile.* **Supported values** The set command specifies these parameters: **<cid>** (PDP Context Identifier) is a number corresponding to a PDP context definition. (See +CGDCONT on page 65.) **<Traffic class>** is a number indicating the application type for which the UMTS bearer service is optimised where **0** = conversational, **1** = streaming, **2** = interactive, and **3** = background. **<Maximum bitrate UL>** is a number specifying the maximum speed (kbps) of uplink traffic delivered to an SAP (Service Access Point). **<Maximum bitrate DL>** is a number specifying the maximum speed (kbps) of downlink traffic delivered by an SAP (Service Access Point). When this parameter is set to “0”, the modem requests the subscribed value. **<Guaranteed bitrate UL>** is a number specifying the guaranteed speed (kbps) of uplink traffic delivered to an SAP (Service Access Point). When this parameter is set to “0”, the modem requests the subscribed value. Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGEQMIN (continued)	**Set or Query Minimum Quality of Service Profile (continued)** **<Guaranteed bitrate DL>** is a number specifying the guaranteed speed (kbps) of downlink traffic delivered by an SAP (Service Access Point). When this parameter is set to “0”, the modem requests the subscribed value. **<Delivery order>** is a number specifying whether in-sequence SDU (Small Downloadable Unit) delivery is to be provided by the UMTS bearer, where **0** = no, **1** = yes, and **2** = subscribed value. **<Maximum SDU size>** is the maximum allowed SDU size, in octets. **<SDU error ratio>** is a string specifying a target ratio for SDUs that are lost or in which errors are detected. (The target applies only to conforming traffic.) This should be entered in the form “mEe”. For example, the value “$5 \cdot 10^{-3}$” should be entered as “5E3”. When this parameter is set to “0E0”, the modem requests the subscribed value. **<Residual bit error ratio>** is a string specifying a target for the undetected bit error ratio in delivered SDUs. This parameter sets the bit error ratio in delivered SDUs if no error detection is requested. This should be entered in the form “mEe”. For example, the value “$5 \cdot 10^{-3}$” should be entered as “5E3”. When this parameter is set to “0E0”, the modem requests the subscribed value. **<Delivery of erroneous SDUs>** is a number that indicates whether SDUs with detected errors are to be delivered, where **0** = no, **1** = yes, **2** = no detect, and **3** = subscribed values. **<transfer delay>** is a number specifying the target duration, in milliseconds, between a request to transfer an SDU at one SAP and delivery of the SDU at the other SAP. When this parameter is set to “0”, the modem requests the subscribed value. **<traffic handling priority>** is a number specifying the importance of SDUs belonging to the UMTS bearer relative to SDUs belonging to other bearers. When this parameter is set to “0”, the modem requests the subscribed value. **+CGEQMIN?** returns the current settings for each defined context, in the same order as specified for the set command, while **+CGEQMIN=?** returns values supported as a compound value. The parameter value ranges for each PDP type are returned on a separate line.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGEQREQ=[<cid> [,<Traffic class> [,<Maximum bitrate UL>] [,Maximum bitrate DL>] [,Guaranteed bitrate UL>] [,Guaranteed bitrate DL>] [,Delivery order>] [,Maximum SDU size>] [,SDU error ratio>] [,Residual bit error ratio>] [,<Delivery of erroneous SDUs>] [,<Transfer delay>] [, <Traffic handling priority>] **+CGEQREQ?** **+CGEQREQ=?** *Note: This command is only available on the AirCard 775. On other products use the command, +CGQREQ, described on page 71.*	**Set or Query Requested Quality of Service Profile** Specifies a Quality of Service Profile to be used when the modem sends an Activate PDP Context Request message to the network. If the specified profile is unavailable, the modem returns an error. *Note: A special form of the set command,* **+CGQEREQ = <cid>***, causes the requested profile for context number* **<cid>** *to become undefined.* If any parameters in the Requested Quality of Service Profile are below those in the Minimum Quality of Service Profile (set with the command +CGEQMIN described on page 66), the command is rejected and the profile is not updated. *Note: The* ***D**##* *command (used to establish GPRS connections) uses only those settings assigned to the PDP Context Identifier 1 (that is, <cid>=1).* All parameters are as outlined in **+CGEQMIN** (page 66). **+CGEQREQ?** returns the current settings for each defined context, in the same order as specified for the set command, while **+CGEQREQ=?** returns values supported as a compound value. The parameter value ranges for each PDP type are returned on a separate line.
+CGEREP= <mode> [,<buffer>] **+CGEREP?** **+CGEREP=?**	**Unsolicited GPRS event reporting control** Enables or disables sending of unsolicited result codes, which return as +CGEV: XXX from the modem to the computer in response to modem or network events. **<mode>** controls the processing of unsolicited result codes specified within this command, while **<buffer>** controls the effect on buffered codes, depending on the <mode> setting. Unsupported settings return an error. **+CGEREP?** returns the current mode and buffer settings, while **+CGEREP=?** returns the modes and buffer settings supported by the modem as compound values. Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGEREP (continued)	**Unsolicited GPRS event reporting control (continued)** The following unsolicited result codes and the corresponding events are defined: • +CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>] - The network has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the modem. • +CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>] - The mobile equipment has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the modem. **Supported values** • **<mode>=0** Buffer unsolicited result codes in the modem, discarding the oldest if the buffer is full. No codes are forwarded to the computer. • **<mode>=1** Discard unsolicited result codes when in online data mode, otherwise forward them directly to the computer. • **<mode>=2** Buffer unsolicited result codes in the modem when in online data mode and flush them to the computer when the link becomes available, otherwise forward them directly to the computer. • **<buffer>=0** When mode 1 or 2 above is entered, clear the modem's buffer of unsolicited result codes. • **<buffer>=1** The modem's buffer of unsolicited result codes defined within this command is flushed to the host computer when **<mode>=1** or **2** is entered (OK response is given before flushing the codes). • +CGEV: NW DETACH - The network has forced a GPRS detach. This implies that all active contexts have been deactivated. These are not reported separately. • +CGEV: ME DETACH - The mobile equipment has forced a GPRS detach. This implies that all active contexts have been deactivated. These are not reported separately. +CGEV: ME CLASS <class> - The mobile equipment has forced a change of MS class. The highest available class is reported (see +CGCLASS, page 64).
+CGMI	**Request manufacturer identification** Identifies Sierra Wireless as the manufacturer of the modem, returned as a text string. Equivalent to **+GMI** (page 97).
+CGMM	**Request model identification** Returns a text string identifying the model of the modem. Equivalent to **+GMM** (page 97).
+CGMR	**Request revision identification** Returns the current firmware revision of the modem as a text string. Equivalent to **+GMR** (page 97).

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGPADDR [=<cid>] **+CGPADDR=?** *Note: The Sierra Wireless modem permits only one PDP context to be active at a time.*	**Show PDP address** Returns a list of PDP addresses for the specified context identifier. The command returns the IP address. The address may be static or dynamic. For a static address, it will be the one set by the **+CGDCONT** command (page 65) when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation for the specified **<cid>**. If no address is available, it is omitted. **<cid>** is a numeric parameter which specifies a particular PDP context definition (see the **+CGDCONT** command, page 65). If no **<cid>** is specified, the address for the current defined context is returned. **+CGPADDR=?** returns the current defined <cid>.
+CGQMIN [=<cid>] [,<precedence >] [,<delay>] [,<reliability>] [,<peak>] [,<mean>] **+CGQMIN?** **+CGQMIN=?** *Note: To specify a particular QoS profile, rather than the minimum, use the +CGQREQ command (page 71).*	**Set or query minimum acceptable quality of service** *Note: If you are using an AirCard 775, use the command +CGEQMIN described on page 66, rather than this command.* Specifies a minimum acceptable Quality of Service (QoS) profile for the specified local context identification parameter **<cid>**. (See pages 65 and 70 for more information.) The modem checks the quality of service profile against the negotiated profile returned in the Activate PDP Context Accept message. *Note: The **D**##* command (used to establish GPRS connections) uses only those settings assigned to the PDP Context Identifier 1 (that is, <cid>=1).* **+CGQMIN?** returns the current settings for each defined context, in the same order as specified for the set command, while **+CGQMIN=?** returns values supported as a compound value. The parameter value ranges for each PDP type are returned on a separate line. *Note: A special form of the set command, **+CGQMIN= <cid>**, causes the minimum acceptable profile for context number **<cid>** to become undefined. In this case no check is made against the negotiated profile.* If a value is omitted for a particular class, then that class is not checked. **Supported values** The **+CGQMIN** command is effectively an extension to the **+CGDCONT** command (page 65). The QoS profile consists of a number of parameters, each of which may be set to a separate value. The **<cid>** value remains as discussed on pages 65 and 70. The remaining parameters are all numeric, and defined in the GSM 03.60 standard: Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGQMIN (continued)	**Set or query minimum acceptable quality of service (continued)** • **<precedence>** Specifies the precedence class where 0=subscribed, 1=high, 2=medium, and 3=low. • **<delay>** is a numeric parameter which specifies the delay class where 0=subscribed, 1=low, 2=medium, 3=high, and 4=best effort. • **<reliability>** Specifies the reliability class where 0=subscribed (default), 1=acknowledged, 2=frame acknowledged, 3=block mode acknowledged, 4=data protected, 5=unprotected. • **<peak>** Specifies the peak throughput class where 0=subscribed (default), 1=up to 8 kbps, 2=up to 16 kbps, 3=up to 32 kbps, 4=up to 64 kbps, 5=up to 128 kbps, 6=up to 256 kbps, 7=up to 512 kbps, 8=up to 1024 kbps, 9=up to 2048 kbps. • **<mean>** Specifies the mean throughput class where 0=subscribed, 1=up to ~ 0.22 bps, 2=up to ~ 0.44 bps, 3=up to ~ 1.11 bps, 4=up to ~ 2.2 bps, 5=up to ~ 4.4 bps, 6=up to ~ 11.1 bps, 7=up to ~ 22 bps, 8=up to ~ 44 bps, 9=up to ~ 111 bps, 10=up to ~ 0.22 kbps, 11=up to ~ 0.44 kbps, 12=up to ~ 1.11 kbps, 13=up to ~ 2.2 kbps, 14=up to ~ 4.4 kbps, 15=up to ~ 11.1 kbps, 16=up to ~ 22 kbps, 17=up to ~ 44 kbps, 18=up to ~ 111 kbps, 19=best effort (default).
+CGQREQ [=<cid>] [,<precedence >] [,<delay>] [,<reliability>] [,<peak>] [,<mean>] **+CGQREQ?** **+CGQREQ=?**	**Request specified (or query current) quality of service profile** *Note: If you are using an AirCard 775, use the command +CGEQREQ described on page 68, rather than this command.* Specifies a Quality of Service Profile to be used when the modem sends an Activate PDP Context Request message to the network. If the specified profile is unavailable, the modem returns an error. *Note: The **D**##** command (used to establish GPRS connections) uses only those settings assigned to the PDP Context Identifier 1 (that is, <cid>=1).* All parameters are as outlined in **+CGQMIN** (page 70). *Note: To specify a minimum acceptable QoS profile, use the **+CGQMIN** command (page 70).*

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CGREG=<n> **+CGREG?** *Note: For circuit switched data registration status, see +CREG on page 91*	**GPRS network registration status** For GPRS data connections, **+CGREG=<n>** controls the presentation of an unsolicited result code, which appears in one of several forms depending on the value of **<n>** (or an error if no status is available): • When **<n>=0**, no network registration unsolicited result codes are returned. • +CGREG: <stat> (registration status only) is returned when **<n>=1** and there is a change in the modem's GPRS network registration status. • +CGREG: <stat>,<lac>,<ci> (which includes location information) is returned when **<n>=2** and there is a change of the network cell. **+CGREG?** returns the status of result code presentation and an integer <stat> showing the current status. (Location information elements <lac> and <ci> are returned only when **<n>=2** and the modem is registered on the network.) **Returned values** The possible returned values of <stat> are: • 0: not registered, modem is not currently searching a new operator to register to • 1: registered <lac> is a string specifying a two-byte location area code in hexadecimal format (e.g. “00C3” equals 195 in decimal). <ci> is a string specifying a two-byte cell ID in hexadecimal format.
+CGSMS[=<n>] **+CGSMS?** **+CGSMS=?**	**Select service for SMS messages** Specifies which service to use for text messaging (Short Message Service, SMS): • **<n>=0**: GPRS • **<n>=1**: circuit switched data (CSD) *(default)* • **<n>=2**: GPRS preferred (use CSD if GPRS not available) • **<n>=3**: circuit switched preferred (use GPRS if CSD not available) **+CGSMS?** returns the currently selected service or service preference, while **+CGSMS=?** returns the currently available services and service preferences. See page 27 for more information on SMS commands.
+CGSN	**Display IMEI** Returns the IMEI (International Mobile Equipment Identity) of the modem. The IMEI uniquely identifies each device on the GSM network. The same value is returned by **+GSN**. (See page 98).
+CIMI	**Request international mobile subscriber identity (IMSI)** Returns the IMSI value that identifies the individual SIM card used in the Sierra Wireless modem.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CLCC	**List current calls** Lists the current calls and their type, if any available. Each call reports on a different line in this format: +CLCC: <id1>,<dir>,<state>,<bst>,<conf>, <number>,<type>,<alpha> **Returned values** <idx> is an integer call identification number, as described in GSM 02.30 [19] subclause 4.5.5.1. <dir> describes the call type: • <dir>=0: mobile originated (MO) call • <dir>=1: mobile terminated (MT) call <state> shows the state of the call: • <stat>=0: active • <stat>=1: held • <stat>=2: dialing (MO call) • <stat>=3: alerting (MO call) • <stat>=4: incoming (MT call) • <stat>=5: waiting (MT call) <bst> indicates the bearer service type: • <bst>=0: voice • <bst>=1: data • <bst>=9: unknown <conf> indicates whether the call is a party in a conference (multi-party) call: • <conf>=0: call is not part of a conference call • <conf>=0: call is part of a conference call <number> is a string specifying the phone number in the format specified by <type>.<type> is the type of address octet in integer format (refer to GSM 04.08 [8] subclause 10.5.4.7) <alpha> is a string corresponding to the phone book entry for <number>, using the character set specified in +CSCS (page 93).

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CLCK=<fac>, <mode> [,<passwd>] [,<class>] **+CLCK=?**	**Facility lock** Locks, unlocks, or interrogates the modem or a network facility specified in **<fac>**. **+CLCK=?** returns a list of supported <fac>s. **Supported values** **<fac>** values include: **SC** SIM, lock SIM Card. The SIM requests a password when the command is issued or when the modem is powered on. **AO** BAOC, Barr All Outgoing Calls—see GSM 02.88[6] clause 1 **OI** BOIC, Barr Outgoing International Calls—see GSM 02.88[6] clause 1 **OX** BOIC-exHC, Barr Outgoing International Calls except to Home Country—see GSM 02.88[6] clause 1 **AI** BAIC, Barr All Incoming Calls—see GSM 02.88[6] clause 2 **IR** BIC-Roam, Barr Incoming Calls when roaming outside the home country—see GSM 02.88[6] clause 2 **AB** All Barring services (see GSM 02.30[19])—applicable only when **<mode>=0**) **AG** All outGoing barring services (see GSM 02.30[19])—applicable only when **<mode>=0**) **AC** All inComing barring services (see GSM 02.30[19])—applicable only when **<mode>=0**) **PN** Network Personalisation (see GSM 02.22[33]) **<mode>** specifies whether to lock, unlock, or query: **<mode>=0** to unlock, **<mode>=1** to lock, and **<mode>=2** to query the lock status. When **<mode>=2**, a successful query returns each class on its own line: +CLCK: <status>,<class> where <status> is either 0 (not active) or 1 (active). **<passwd>** is a string password, either specified for the facility or set using the +CPWD command (see page 89). **<class>** is a sum of integers each representing a class of information as follows (default 7): • **1** voice (telephony) • **2** data (refers to all bearer services) • **7** all classes *(default)*

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CLIP=<n> **+CLIP?**	**Calling line identification presentation** Sets whether the modem user can receive the Calling Line Identity (CLI, similar to Caller ID for landline phones) for incoming calls, using one of two values: • **<n>=0:** CLI disabled • **<n>=1:** CLI enabled If enabled (**<n>=1**), a RING or +CRING returns the following information. (See "Result Codes" on page 106.) +CLIP: <number>,<type>**Returned values** Returned values when **<n>=1** and an incoming call is detected appear as +CLIP: <number>,<type> and are: • <number>:a string-type phone number of format specified by <type> • <type>:the type of address octet in integer format (see GSM 04.08[8] subclause 10.5.4.7)—<type>=145 when the dialing string includes the international access code character +, otherwise it is 129. **+CLIP?** returns whether CLI is enabled or disabled locally, and whether it is available to the user on the network: +CLIP:0,0 CLI disabled, CLIP not provisioned on network +CLIP:0,1 CLI disabled, CLIP provisioned +CLIP:0,2 CLI disabled, CLIP network status unknown +CLIP:1,0 CLI disabled, CLIP not provisioned on network +CLIP:1,1 CLI disabled, CLIP provisioned +CLIP:1,2CLI disabled, CLIP network status unknown
+CLIR=<n> **+CLIR?**	**Calling line identification restriction** Sets whether the Sierra Wireless modem respects the remote caller's restriction of CLI (Calling Line Identity) information, and queries the status of CLIR service on the network. **Supported values** To set the CLIR status, the following values are supported: • **<n>=0** Presents CLI information according to the CLIR subscription setting on the network. *(Default)* • **<n>=1** Invokes CLIR (i.e. blocks incoming CLI information) • **<n>=2** Suppresses CLIR (i.e. always displays incoming CLI information if available) Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CLIR (continued)	**Calling line identification restriction (continued)** *Note: CLIR can only be invoked and suppressed if subscription to the service allows for it.* **+CLIR?** returns the current setting and CLIR network status: +CLIR:0,0 CLIR default, CLIR not provisioned on network +CLIR:0,1 CLIR default, CLIR provisioned (permanent mode) +CLIR:0,2 CLIR default, CLIR network status unknown +CLIR:0,3 CLIR default, CLIR presentation restricted (temporary) +CLIR:0,4 CLIR default, CLIR presentation allowed (temporary) +CLIR:1,0 CLIR invoked, CLIR not provisioned on network +CLIR:1,1 CLIR invoked, CLIR provisioned (permanent mode) +CLIR:1,2 CLIR invoked, CLIR network status unknown +CLIR:1,3 CLIR invoked, CLIR presentation restricted (temp) +CLIR:1,4 CLIR invoked, CLIR presentation allowed (temp) +CLIR:2,0 CLIR suppressed, CLIR not provisioned on network +CLIR:2,1 CLIR suppressed, CLIR provisioned (permanent) +CLIR:2,2 CLIR suppressed, CLIR network status unknown +CLIR:2,3 CLIR suppressed, CLIR presentation restricted (temp) +CLIR:2,4 CLIR suppressed, CLIR presentation allowed (temp)
+CMEE=<n> **+CMEE?**	**Report mobile equipment error** Sets whether the modem reports errors as simply ERROR, or with details in the form +CME ERROR: <err> (either numeric or verbose). *Note: Regardless of how this is set, an ERROR is returned in certain cases (such as if the wrong syntax or an invalid parameter is used).* **Supported values** <n> can be set to one of three values: • **<n>=0:** Do not report detailed errors, simply return ERROR. • **<n>=1:** Enable +CME ERROR: <err> result codes and use numeric values for <err>. • **<n>=2:** Enable +CME ERROR: <err> result codes and use verbose (English) values for <err>. Numeric and verbose values for <err> appear on page 106. **+CMEE?** returns the current setting.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
PDU mode: **+CMGC= <length>** or *Text mode:* **+CMGC=<fo>, <ct>[,<pid>] [,<mn>][,<da>] [,<toda>]** *Note: Also see the* **+CMGS** *command on page 80.*	**Send SMS command** Sends an SMS Command message from the host computer to the network (SMS-COMMAND). The message reference value <mr> is returned (as +CMGC: <mr>) to the host computer if the message is successfully delivered, and can be used to identify the message if an unsolicited delivery status code is received. How the command is used depends on the SMS message format specified in **+CMGF** (page 78): • In PDU mode (**+CMGF=0**), messages are sent as follows: **+CMGC=<length><CR>** ***<PDU data>*<CTRL+Z>** • In text mode (**+CMGF=1**), messages are sent in this form: **+CMGC=<fo>,<ct>,<pid>,<mn>,<da>,<toda><CR>** ***<message text>*<CTRL+Z>** *Note: In both modes, sending* **<ESC>** *instead of* **<CTRL+Z>** *quits without sending the message.* **Supported values** Parameters for the text-mode send command are: • **<fo>** first octet of GSM 03.40 SMS-COMMAND in integer format *(default 2)* • **<ct>** GSM 03.40 TP-Command-Type in integer format *(default 0)* • **<pid>** GSM 03.40 TP-Protocol-Identifier in integer format *(default 0)* • **<mn>** GSM 03.40 TP-Message-Number in integer format • **<da>** GSM 03.40 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by **<toda>** • **<toda>** GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format (when first character of **<da>** is + (IRA 43) default is 145, otherwise default is 129) For PDU mode: • **<length>** integer type value indicating the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
+CMGD=<index>	**Delete SMS message** Deletes the **<index>**-numbered message from the currently selected memory store. (See **+CMGS**, page 80).

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CMGF=<n> **+CMGF?**	**Select SMS message format** Specifies the input and output format of messages to use. **<n>** indicates the format of messages used with send, list, read and write commands and unsolicited result codes resulting from received messages. There are two available formats for text messages: • **<n>=0** specifies PDU (Protocol Description Unit) mode, in which the complete SMS message, including all header information, is passed as a binary string.. • **<n>=1** specifies text mode, where the headers and body of the messages are given as separate parameters. Text mode is an encoding of the bit stream represented by PDU mode. See **+CMGC** (page 77) for information on sending messages. **+CMGF?** returns the current setting.
+CMGL [=<status>]	**List SMS messages** Lists messages of the specified **<status>** from the message store. If **<status>** is omitted, the command lists all messages (same as **<status>=4**). The format of the returned messages depends on whether the modem has been set to PDU or text mode (see **+CMGF**, page 78): • In PDU mode, returned messages appear in the form: +CMGL: <index>,<status>,<alpha>, <length><CR><LF> *<pdu data>* +CMGL: <index>,<status>,<alpha>, <length><CR><LF> *<pdu data>* etc. • In text mode, returned messages appear in the form: +CMGL: <index>,<stat>,<oa/da>,<alpha>, <scts>,<tooa/toda>, <length><CR><LF> *<message text>* +CMGL: <index>,<stat>,<oa/da>,<alpha>, <scts>,<tooa/toda>, <length><CR><LF> *<message text>* [etc.] Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CMGL (continued)	**List SMS messages (continued)** **Supported values** The format of **<status>** depends on whether the modem is in PDU or text mode. In PDU mode, it is an integer; in text mode, a string: **PDU Mode** / **Text Mode** / **Meaning** 0 / REC UNREAD / Received unread (i.e. new message) 1 / REC READ / Received read 2 / STO UNSENT / Stored unsent 3 / STO SENT / Stored sent 4 / ALL / All messages (default if **<status>** omitted) **Returned values** <index> — An integer uniquely identifying a message in the message store. The value lies in the range of location numbers supported by the message memory. <status> — The message status, as listed on page 78. <alpha> — An alphanumeric phone number representing the destination address <da> or originating address <oa> in the modem phonebook. <length> — The length of the message body in characters. <pdu> — In PDU mode, the SMS message, in the form of the GSM 04.11 SC address followed by the GSM 03.40 TPDU in hexadecimal format. The modem converts each octet of TP data unit into two IRA character long hexadecimal numbers (e.g. an octet with integer value 42 is presented to the computer as two characters 2A—IRA 50 and 65.) <oa/da> — The Originating-Address-Value <oa> field in string format; type of address given by <tooa>, or the Destination-Address field <da> in string format; type of address given by <toda>. <scts> — Service-Centre-Time-Stamp in time-string format: “yy/MM/dd,hh:mm:ss±zz”. <tooa/toda> — The Type-of-Originating Address octet <tooa> in integer format, or the Type-of-Destination Address octet <toda> in integer format. In both cases, when the first character of the phone number is “+” (IRA 43), the default is 145; otherwise the default is 129. <data> — Message body data for text mode messages.
+CMGR=<index>	**Read SMS message** Returns the message with the location value **<index>** from the message store. If the **<status>** of the message is “received unread” (<status>=0 in PDU mode, or <status>=REC UNREAD in text mode), then its status changes to “received read” (1 or REC READ). The format of the returned message depends on whether the modem is in PDU or text mode (see **+CMGF**, page 78): • In PDU mode, the returned message appears in the form: +CMGR: <status>,<alpha>,<length> <pdu> • In text mode, the returned message appears in the form: +CMGR:<status>,<oa>,<alpha>,<scts>,<tooa>,<fo>, <pid>,<dcs>, <sca>,<tosca>,<length> <data> Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CMGR (continued)	**Read SMS message (continued)** **Returned values** Returned parameters are as described in **+CMGL** (page 79), with the addition of: <fo> The first octet of the SMS message according to the ETSI recommendation 03.40. <pid> The Protocol-Identifier in integer format *(default 0)*. <dcs> Depending on the command or result code: GSM 03.38 SMS Data Coding Scheme *(default 0)*, or Cell Broadcast Data Coding Scheme in integer format <sca> A string representing the Service Center address field; the type of address is given by <tosca>. <tosca> Type-of-Service Center Address octet in integer format. As with <tooa> and <toda>, when the first character of the phone number is "+" (IRA 43), the default is 145; otherwise the default is 129.
PDU mode: **+CMGS=** **<length>** or *Text mode:* **+CMGS=<da>** **[,<toda>]**	**Send SMS message** Sends an SMS message to the network (SMS-SUBMIT) directly, without requiring that it be stored in memory. A message reference value <mr> is returned if the message has been successfully delivered, in the form +CMGS: <mr>. It can be used to identify the message if an unsolicited delivery status report result code is returned. **PDU mode** The PDU-mode send command is: **+CMGS=<length><CR>** ***<PDU data>*<CTRL+Z>** **<length>** must indicate the number of octets coded in the TP layer data unit to be given (i.e. SMSC address octets are excluded). The **<pdu data>** must be in hexadecimal format (as specified for <pdu> on page 79) and given in one line. The Sierra Wireless modem converts this coding into the actual octets of the PDU. When the length octet of the SMSC address (given in the **<pdu data>**) equals zero, the SMSC address set with command Service Centre Address **+CSCA** (see page 93) is used. **Text mode** In text mode, the command is in the form: **+CMGS=<da>,<toda><CR>** ***<message text>*<CTRL+Z>** Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CMGS (continued)	**Send SMS message (continued)** The text in **<message text>** is sent to the address **<da>**. **<toda>** is optional—when the first character of the phone number is "+" (IRA 43), it will default to 145; otherwise the default is 129. *Note: In both modes,* **<CTRL+Z>** *(IRA 26) sends the message.* **<ESC>** *(IRA 27) quits without sending.* Sending SMS messages requires that the service center be configured using **+CSAS**. (See page 27.) **Supported values** See **+CMGL** (page 78–79) and **+CMGC** (page 77) for details on the listed parameters.
+CMGW= <length>, <status><CR> <pdu> (PDU mode) or **+CMGW [=<oa/da>] [,<tooa/toda>] [,<status>]<CR> <data>** (text mode)	**Write SMS message to memory** Saves the SMS message (either SMS-DELIVER or SMS-SUBMIT) to the message store. If successful, the memory location <index> of the stored message is returned in the form +CMGW: <index>. By default, message status will be set to "stored unsent" (**<status>=2** or **STO UNSENT**), but another **<status>** may be assigned, as described on page 78. The ending of the message body (in text mode) or PDU (in PDU mode) must be indicated by **<ctrl-Z>** (IRA 26). Saving can be cancelled by passing the **<ESC>** character (IRA 27). **Supported values** See **+CMGL** (page 78–79) for details on the listed parameters. *Note: When storing an SMS-DELIVER to the message store in text mode,* **<vp>** *can be substituted for* **<scts>** *(see* **+CSMP***, page 93).*
+CMSS=<index> [,<da>][,<toda>]	**Send SMS message from storage** Sends the message with location value **<index>** from the message store to the network (SMS-SUBMIT). **<da>** and **<toda>** are optional—if new values are provided, they will be used instead of the **<da>** stored with the message and the default **<toda>**. A message reference value <reference> is returned if the message has been successfully delivered, in the form +CMSS: <reference>. It can be used to identify the message if an unsolicited delivery status report result code is returned. **Supported values** See **+CMGL** (page 78–79) for details on the listed parameters.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CNMI=<mode> [,<mt>][,<bm>] [,<ds>][,<bfr>] **+CNMI?**	**New SMS message indications** Sets or queries how the computer is notified of new messages when the modem is active. **<mode>** controls the processing of unsolicited result codes, **<mt>** sets the result code indication routing for SMS-DELIVERs, **<bm>** for CBMs and **<ds>** for SMS-STATUS-REPORTs. **<bfr>** defines the handling method for buffered result codes when **<mode>=1**. **+CNMI?** returns the current settings. The default is +CNMI=1,0,0,0. **Supported values** **<mode>** may be one of four integer values: • **<mode>=0:** Buffer unsolicited result codes in the modem. If the buffer is full, the oldest codes are replaced with the new received codes. • **<mode>=1:** Discard indication and reject new received message unsolicited result codes when the modem-computer link is reserved (e.g. in online data mode); otherwise forward them directly to the computer. • **<mode>=2:** Buffer unsolicited result codes in the modem when in online data mode, and flush them to the host computer after reservation. Otherwise forward them directly to the modem. • **<mode>=3:** Forward unsolicited result codes directly to the host computer. **<mt>** may be one of four values: • **<mt>=0:** No SMS-DELIVER indications. • **<mt>=1**: If SMS-DELIVER is stored in the modem, indication of the memory location is routed to the host computer using the unsolicited result code: +CMTI: <mem>,<index> • **<mt>=2**: Indication of SMS-DELIVER is returned using unsolicited result codes: +CMT: <alpha>,<length><CR> <pdu> (in PDU mode) or +CMT: <oa>,<alpha>,<scts>,<tooa>,<fo>,<pid>, <dcs>, <sca>,<tosca>,<length><CR> <data> (in text mode) • **<mt>=3**: Class 3 SMS-DELIVERs are routed directly to the most computer using unsolicited result codes defined in **<mt>=2**. Messages of other classes result in the indication as defined in **<mt>=1**. **<bm>** may be one of two values: • **<bm>=0:** No CBM indications are routed to the host. • **<bm>=1:** New CBMs are routed directly to the host using unsolicited result code: +CBM: <length><CR><LF> *<pdu data>* (PDU mode enabled) or +CBM: <sn>,<mid>,<dcs>, <page>,<pages><CR><LF> *<message text>* (text mode enabled) Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CNMI (continued)	**New SMS message indications (continued)** **<ds>** may be one of two values: • **<ds>=0:** No SMS-STATUS-REPORTs returned • **<ds>=1:** SMS-STATUS-REPORTs returned: +CDS: <length><CR><LF> *<pdu data>* (PDU mode enabled) or +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled) +**<bfr>** may be one of two values: • **<bfr>=0:** The modem's buffer of unsolicited result codes is flushed to the computer when **<mode>=1**, **2**, or **3** is entered. (OK is returned before flushing the codes.) • **<bfr>=1:** The modem's buffer of unsolicited result codes is cleared when **<mode>=1**, **2**, or **3** is entered. *Note: See* **+CMGL** *(page 78–79) and* **+CMGR** *(page 79) for details on the listed parameters.*
+CNUM	**Retrieves the MSISDN from the SIM** Retrieves the MSISDN (Mobile Station International ISDN), or mobile phone number, from the SIM. The MSISDN can be edited in user interface software such as Watcher (the AirCard enabling software). **Response parameters** The response to the +CNUM command has these parameters: **+CNUM:[<alpha>],<number1>,<type1>[,<speed>,<service>[,<itc]]** **[<CR><LF>+CNUM:[<alpha2>],<number2>,<type2>[,<speed>,<service>** **[,<itc>]][...]]** **<alpha*x*>** is an optional alphanumeric string associated with **<number*x*>**. (This can be edited in the user interface software (such as Watcher, the AirCard enabling software). (The character set used is that set with the command **+CSCS**. See page 93.) **<number*x*>** is a string type phone number of the format specified by **<type*x*>**. **<type*x*>** is the type of octet in integer format. (Refer to GSM 04.08 subclause 10.5.4.7. This specification is listed on page 8.) Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CNUM (continued)	**Retrieves the MSISDN from the SIM (continued)** **<speed>** is the data rate as defined by the **+CBST** command. (See page 59.) **<service>** is the service related to the phone number: • **0** Asynchronous modem • **1** Synchronous modem • **2** PAD access (asynchronous) • **3** Packet access (synchronous) • **4** Voice • **5** Fax **<itc>** is the information transfer capability: • **0** 3.1 kHz • **1** UDI (Unrestricted Digital Information transfer)
+COPN	**Read operator names** Returns the list of operator names from the modem. Each operator code that has a corresponding name is returned. **Response parameters** The response to the +COPN command has these parameters: **+COPN: [<numeric1>],<alpha1>** **[<CR><LF>+COPN: [<numeric2>],<alpha2>** **[...]]** **<numeric*n*>** is the operator in numeric format. **<alpha*n*>** is the operator in alphanumeric format.
+COPS=<mode> **[,<format>]** **[,<operator>]** **+COPS?** **+COPS=?**	**Operator selection** **+COPS=<mode>,<format>,<operator>** attempts a forced selection and registration on the GSM network using a particular operator (i.e. GSM service carrier). **<mode>** determines whether the selection is performed automatically by the modem or is forced to the specific operator given in **<operator>**, using the format specified in **<format>**. (The format setting is retained if the **+COPS?** command is reissued.) The selected <mode> applies to all further network registrations (e.g. after **<mode>=2**, the modem is unregistered until **<mode>=0** or **1** is selected). *Note: Unless* **<mode>=4***, if the selected operator is not available, no other operator is selected.* Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+COPS (continued)	**Operator selection (continued)** **+COPS?** returns the current mode and the currently selected operator. If no operator is selected, <format> and <operator> are omitted. **+COPS=?** returns a list of quadruplets, each representing an operator present on the GSM network, follows by a list of supported <modes> and <format>s: +COPS: <status>,<loperator>, <soperator>,<noperator> supported <mode>s,supported <format>s Each quadruplet consists of a <status> integer indicating the availability of the operator, the long <loperator> and short <soperator> alphanumeric names of the operator, and the <noperator> numeric code for the operator. If any of the formats is unavailable, its field is empty (*not* omitted). *Note: Operators are listed in this order: home network, networks listed in the SIM card, and other networks.* **Supported values** **<mode>** sets how the modem should determine the GSM operator. It can be one of four values: • **<mode>=0**: Automatically (**<operator>** field is ignored) • **<mode>=1**: Manually (**<operator>** field required, no operator selected if not available) • **<mode>=2**: Deregister from the network. • **<mode>=3**: Only set the **<format>** (for the read command **+COPS?**)—do not attempt registration/deregistration. The <operator> field is ignored. • **<mode>=4**: Manually if possible (**<operator>** field is required). If manual selection fails, the modem switches to automatic (**<mode>=0**). **<format>** selects which format to use for the **<operator>** parameter. It can be one of three values: • **<format>=0:** Long format alphanumeric (equivalent to <loperator> from **+COPS=?**). • **<format>=1**: Short format alphanumeric (equivalent to <soperator>). • **<format>=2:** numeric (equivalent to <noperator>). **<operator>** is a string, whose type is determined by the **<format>** parameter. The long alphanumeric format can be upto 16 characters long, and the short up to 8 characters. The numeric format is the GSM Location Area Identification number (see the standard GSM 04.08[8] subclause 10.5.1.3), in the format: <country code digit 3><country code digit 2> <country code digit 1><network code digit 2> <network code digit 1> Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+COPS (continued)	**Operator selection (continued)** <status> returns the status of an operator: • <status>=0: Unknown • <status>=1: Available • <status>=2: Current • <status>=3: Forbidden
+CPAS	**Modem activity status** Returns the activity status of the Sierra Wireless modem in the form: +CPAS: <n>. The command can be used to interrogate the modem before requesting action from it. **Supported values** <n> can have one of six values: • <n>=0: Ready to accept commands. • <n>=2: Unknown—may not respond to commands. • <n>=3: Ringing—the modem is ready for commands, but the ringer is active. • <n>=4: Call in progress—the modem is ready for commands, but a call is in progress.
+CPBF=<string> **+CPBF=?**	**Find phonebook entries** Searches the phonebook memory (as selected in **+CPBS**, see page 87) for the text specified in **<string>**. Returns all results matching or beginning with **<string>**, in the following form: +CPBF: <index>,<number>,<type>,<text> If more than one entry returns, each one appears on a separate line. The **+CPBF=?** command returns the maximum lengths of the <number> and <text> parameters, both as integers: +CPBF: <nlength>,<tlength> *Note: If **+CPBS** has set the phonebook memory to use the SIM card, parameter lengths may not be available.* Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CPBF (continued)	**Find phonebook entries (continued)** **Supported values** **<string>** is alphanumeric, with a maximum length of <tlength> as noted above. Returned parameters from searches are: • <index>: Integer values indicating the phonebook location of the returned entry. • <number>: A string of type specified in <type>, showing the phone number of the entry. • <type>: The type of address octet in integer format (see GSM 04.08 [8] subclause 10.5.4.7). • <text>: A string of maximum length <tlength>, with a character set as specified in **+CSCS** (page 93), indicating the name of the entry.
+CPBR=<index> [,<index> (etc.)] **+CPBR=?**	**Read phonebook entries** Similar to **+CBPF** (page 86), but instead of searching by alphanumeric string, returns phonebook entries from the preferred memory (see **+CPBS**, page 87) using the specified **<index>** numbers. All returned values are as discussed in **+CPBF** on page 86. **+CPBR=?** returns the index location range supported by the current storage as a compound value, and the maximum lengths of the **<number>** and **<text>** fields (i.e. <nlength>,<tlength>: +CPBF: <indexrange>,<nlength>,<tlength> *Note: If **+CPBS** has set the phonebook memory to use the SIM card, parameter lengths may not be available.*
+CPBS=<type> **+CPBS?**	**Phonebook memory storage** Sets which memory type to use for phonebook commands. **+CPBS?** returns the current storage type in use (a string value), as well as the number of used locations and the total number of locations in the memory (both integers): +CPBF: <type>,<used>,<total> **Supported values** The following memory types may be set for **<type>**: • **<type>=DC:** The dialled calls list (**+CPBW** not applicable—page 88) • **<type>=FD:** The SIM fixed dialing phonebook • **<type>=LD:** The SIM last dialing phonebook • **<type>=ON:** The SIM's or modem's "own numbers" (MSISDNs) list • **<type>=SM:** The SIM phonebook *Note: If the phonebook memory is set to use the SIM card, parameter lengths may not be available (see **+CPBF**, **+CPBR**, and **+CPBW** commands, pages 86, 87, and 88).*

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CPBW =[<index>], [<number>] [,<format>] [,<text>] **+CPBW=?**	**Write phonebook entry** Creates, overwrites, or erases a phonebook entry in the memory specified by **+CPBS** (see page 87). The parameters are the same as defined in **+CPBF** (page 86), specifying the phonebook entry number (**<index>**), the phone number (**<number>**), the phone number format (**<format>**), and the text name for the entry (**<text>**). If **<number>** and **<text>** are omitted, the phonebook entry is deleted. If **<index>** is left out but **<number>** is provided, a new entry is created in the first free location in the phonebook. *Note: The following characters in* **<text>** *must be entered via the escape sequence:* **GSM char.** **Seq.** **Seq.(hex)** **Note** **** \5C 5C 35 43 backslash **"** \22 5C 32 32 string delimiter **BSP** \08 5C 30 38 backspace **NULL** \00 5C 30 30 GSM null *0 (GSM null) may cause problems for application layer software when reading string lengths.* **+CPBW=?** returns the location range as a compound value, he maximum length of the **<number>** field, supported number formats of the storage, and the maximum length of **<text>** field: +CPBF: <indexrange>,<nlength>, <typerange>,<tlength> *Note: If* **+CPBS** *has set the phonebook memory to use the SIM card, parameter lengths may not be available.*

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CPIN=<pin> [,<newpin>] **+CPIN?** *Note: When the modem is waiting for a SIM PIN, SIM PUK, or PH-SIM password, it will still accept the +CGMI, +CGMM, +CGMR, +CGSN, emergency call, +CPAS, and +CPIN commands.*	**Enter PIN** Sends a PIN (Personal Identification Number) password **<pin>** to the modem in order to authenticate a command. There are several types of PINs, described below. If no PIN request is pending from the modem, the command returns an error. Certain types of password requests (SIM PUK or SIM PUK2) require a second password **<newpin>**, which replaces the old PIN in the SIM card. The **+CPIN?** command returns +CPIN: <code>, indicating which password is required, if any: <code>=READY — Modem is not waiting for a PIN. <code>=SIM PIN — SIM password. <code>=SIM PUK — SIM unblocking. <code>=PH-SIM PIN — Password between modem and SIM card (anti-theft). <code>=PH-SIM PUK — Unblocking password between modem SIM card (anti-theft). <code>=SIM PIN2 — SIM password 2. (Only if preceding command was acknowledged with +CME ERROR:17.) <code>=SIM PUK2 — SIM unblocking password 2. (Only if preceding command was acknowledged with +CME ERROR:18.)
+CPWD=<fac>, [<oldpassword>],<new password> **+CPWD=?**	**Change password** Sets a new password for the facility lock function defined by the Facility Lock **+CLCK** command (see page 74). **+CPWD=?** returns a list of pairs which show the available facilities and the maximum length of their passwords: +CPWD: <fac>,<passlength> <fac>,<passlength> etc. **Supported values** The **+CPWD** command generally supports the same values of **<fac>** shown for the **+CLCK** command (page 74). However, **+CPWD** also supports the additional value **<fac>=P2** for the SIM PIN2, and does **not** support **<fac>=PS**, **PN**, **PU**, **PP**, or **PC**. **<oldpassword>** and **<newpassword>** are both strings, defining the old password and the new one which is to replace it. <passlength> is an integer showing the maximum number of characters permitted for a password for the <fac> shown.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CR=<n> **+CR?** *Note: This command replaces the V.25*ter *command Modulation Reporting Control +MR, which is not appropriate for use on the GSM network.*	**Service reporting control** Sets whether service type is returned (using the result code +CR: <service>) when the modem has determined which speed and quality of service will be used, but before any error control or data compression reports are transmitted, and before CONNECT is returned. • **<n>=0** sets the modem not to report the service type. • **<n>=1** reports service type. **+CR?** returns the current setting. The <service> parameter in result codes reports: • ASYNC asynchronous transparent • SYNC synchronous transparent • REL ASYNC asynchronous non-transparent • REL SYNC synchronous non-transparent Data compression reporting can be enabled with the +DR command (page 96).
+CRC=<n> **+CRC?**	**Cellular result codes for incoming calls** Sets whether incoming calls or GPRS network requests for PDP context activation indicate a simple RING or a detailed, extended-format result code in the form +CRING: <type>: • **<n>=0** disables the extended format, returning only RING. • **<n>=1** enables the extended format in the form +CRING: <type>. **+CRC?** returns the current setting. **Supported values** Incoming calls or PDP context activation requests report the following values for +CRING: <type>: <type>=ASYNC asynchronous transparent <type>=SYNC synchronous transparent <type>=REL ASYNC asynchronous non-transparent <type>=REL SYNC synchronous non-transparent <type>=VOICE normal voice For GPRS context activation, <PDP_type> and <PDP_addr> are as defined in the Define PDP Context (**+CGDCONT**) command (see page 65).

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CREG[=<n>] **+CREG?** *Note: For GPRS data registration status, see +CGREG on page 72.*	**GSM network registration** For GSM CSD or voice connections, **+CREG=<n>** controls the presentation of an unsolicited result code, which appears in one of several forms depending on the value of **<n>** (or an error if no status is available): • When **<n>=0**, no network registration unsolicited result codes are returned (the default). • +CREG: <stat> (registration status only) is returned when **<n>=1** and there is a change in the modem's GPRS network registration status. • +CREG: <stat>,<lac>,<ci> (which includes location information) is returned when **<n>=2** and there is a change of the network cell. **+CREG?** returns the status of result code presentation and an integer <stat> showing the current status. (Location information elements <lac> and <ci> are returned only when **<n>=2** and the modem is registered on the network.) **Returned values** The possible returned values of <stat> are: • 0: not registered; not seeking a new operator • 1: registered, home network • 2: not registered; currently seeking a new operator • 3: registration denied • 4: unknown • 5: registered, roaming <lac> is a string specifying a two-byte location area code in hexadecimal format (e.g. “00C3” equals 195 in decimal). <ci> is a string specifying a two-byte cell ID in hexadecimal format.
+CRES	**Restore SMS settings** Restores the SMS settings of the Sierra Wireless modem for **+CMGF** (page 78), **+CNMI** (page 82), and **+CSDH** (page 93) from settings stored in non-volatile memory. *Note: For information on saving these settings to non-volatile memory, see **+CSAS** on page 92.*

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CRLP[=<iws>] [,<mws>][,<T1>] [,<N2>] [,<version>] **+CRLP?** **+CRLP=?**	**Radio link protocol** When originating non-transparent data calls, the **+CLRP** command sets the Radio Link Protocol (RLP) parameters. **+CRLP?** returns current settings for each supported RLP <version>, each on a separate line, with only RLP parameters applicable to the corresponding <version> on each line returned: +CRLP: <iws>,<mws>,<T1>,<N2>,<version>,<T4> +CRLP: <iws>,<mws>,<T1>,<N2>,<version>,<T4> etc. **+CRLP=?** command returns values supported by the modem as a compound value. The RLP parameter value ranges for each <version> are returned on a separate line: +CRLP: supported <iws>s, supported <mws>s, supported <T1>s, supported <N2>s, <version>, supported <T4>s +CRLP: supported <iws>s, supported <mws>s, supported <T1>s, supported <N2>s, <version>, supported <T4>s etc. *Note: See also* **+DS** *(page 97).* **Supported values** **<version>** is the RLP version number in integer format, either **0** or **1**. If it is not present, **<version>=0** is the default. *Versions 0 and 1 share the same parameter set.* **+CRLP?** *and* **+CRLP=?** *return only one line for this set (where* **<version>** *is not present).***<iws>, <mws>, <T1>**, and **<N2>** are the IWF-to-MS window size, MS-to-IWF window size, acknowledgement timer, and retransmission attempts, respectively. All are integers, and their default values and value ranges depend on the RLP version—see the standard GSM 04.22[18]). However, versions 0 and 1, supported here, share the same parameter values: **Param** **Range** **Default** **Description** **<iws>** 0–255 61 interworking window size **<mws>** 0–255 61 mobile window size **<T1>** 0–255 48 acknowledgment timer (10 ms increments) **<N2>** 0–255 6 retransmission attempts
+CSAS	**Save SMS settings** Saves the current SMS settings for **+CMGF** (page 78), **+CNMI** (page 82), and **+CSDH** (page 93) to non-volatile memory. *Note: For information on restoring these settings to active memory, see* **+CRES** *on page 91.*

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CSCA=<sca> [,<tosca>] **+CSCA?**	**SMS service center address** Updates the SMSC (SMS Service Center) address, through which mobile originated SMS messages are transmitted from the modem. The setting is used in both PDU and text modes. *Note:* **<sca>** *must be set before SMS messages can be sent.* **<sca>** is a string indicating the service center address, as a GSM 04.11 RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters. The type of address is given by **<tosca>**, which is optional. if it is not specified, when the first character of the phone number is + (IRA 43), the default is **145**; otherwise the default is **129**. **+CSCA?** returns the current setting.
+CSCS [=<string>] **+CSCS?**	**Character set** Tells the modem which character set is used by the connected computer. The modem can then convert character strings correctly between the character sets in use on the two devices. This command is available for querying and to support GSM standards only. The Sierra Wireless modem supports only the GSM standard character set, **<string>=GSM**, which is the GSM default alphabet (GSM 03.38 subclause 6.2.1). **+CSCS?** returns the current setting.
+CSDH=<n> **+CSDH?**	**Show SMS text mode parameters** Controls whether detailed header information is shown in SMS text mode result codes. <n> can be one of two values: • **<n>=0:** Do not show responses with optional parameters (detailed headers). • **<n>=1:** Show responses with optional parameters. **+CSDH?** returns the current setting.
+CSMP[=<fo>] [,<vp>][,<pid>] [,<dcs>] **+CSMP?**	**Set SMS text mode parameters** In SMS text mode, this command selects values for additional parameters needed when an SMS message is sent to the network or stored in memory. It is possible to set the validity period **<vp>** starting from when the message is received by the SMSC (**<vp>** as an integer between 0–255, default 167) or define the absolute time of the validity period termination (**<vp>** as a time string). The format of **<vp>** is given by **<fo>**. Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CSMP (continued)	**Set SMS text mode parameters (continued)** *Note: When storing an SMS-DELIVER to the message store in text mode (see* **+CMGW***, page 81),* **<vp>** *can be substituted for* **<scts>***.* **+CSMP?** returns the current settings. **Supported values** The validity period **<vp>** determines when an SMS message expires. It can be an integer between 0 and 255 days (default 167), or a time string of the form "yy/MM/dd,hh:mm:ss±zz". Its format is determined by the **<fo>** parameter. Other parameters are as described for **+CMGR** on page 79.
+CSMS= <service> **+CSMS?**	**SMS message service** Selects the SMS message service to be used by the Sierra Wireless modem, as specified in **<service>**. It returns the types of messages supported by the service in the form: +CSMS: <mt>,<mo>,<bm> • <mt> for mobile terminated messages • <mo> for mobile originated messages • <bm> for broadcast type messages For each returned parameter, 0 means that the type is not supported, and 1 that it is supported. **+CSMS?** returns the current service and message types supported, in the form: +CSMS: <service>,<mt>,<mo>,<bm> **Supported values** • **<service>=0** GSM 03.40 and 03.41—the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2 version 4.7.0. Phase 2+ features which do not require new command syntax may be supported (e.g. correct routing of messages with new Phase 2+ data coding schemes). • **<service>=128** SMS PDU mode - TPDU only used for sending/ receiving SMSs. **<mt>:** Mobile Terminated Messages: • **0** Type not supported • **1** Type supported **<mo>:** Mobile Originated Messages: • **0** Type not supported • **1** Type supported **<bm>:** Broadcast Type Messages: • **0** Type not supported • **1** Type supported

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CSTA [=<string>] **+CSTA?**	**Type of address** Selects the type of number to be used for further dialing commands according to GSM specifications. **+CSTA?** returns the current setting. **Supported values** **<type>** is the type-of-address octet in integer format (see the standard GSM 04.08[8], subclause 10.5.4.7) The default value depends on the format of the dialing string • When the string includes the international access code character +, **<type>=145** by default. • Otherwise, **<type>=129** by default.
+CSQ	**Signal quality report** Returns the Received Signal Strength Indication (RSSI) and channel Bit Error Rate (BER) from the modem: +CSQ: <rssi>,<ber> **Returned values** <rssi> is an integer representing a range of RSSI values: • 0 -113 dBm or less • 1 -111 dBm • 2-30 -109 through -53 dBm • 31 -51 dBm or greater • 99 not known or not detectable <ber> is an integer representing the percentage of bit errors: • 0-7 RXQUAL values in the table in the standard GSM 05.08[20], subclause 8.2.4: 0=BER < 0.2% 1=0.2% < BER < 0.4% 2=0.4% < BER < 0.8% 3=0.8% < BER < 1.6% 4=1.6% < BER < 3.2% 5=3.2% < BER < 6.4% 1=6.4% < BER < 12.8% 1=12.8% < BER • 99 Not known or not detectable

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+CTMSET= [<enableMOCtm>], [<enableCtm>], [<ctmInterface>], [ctmBaudotRate>] **+CTMSET=?** **+CTMSET?** *Note: This command is only available on the AirCard 775 and a customization is required to enable it.*	**Enable / disable support for CTM / TTY** Enables and disables support for CTM (Cordless Terminal Mobility). When enabled, the modem can be used with a TTY (TeleTYpe device). (The TTY is a device used by the speech and hearing-impaired which connects to the headset connector on the modem.) **Supported values** **<enableMOCtm>:** Mobile originated CTM: • **0** Disable • **1** Enable **<enableCtm>:** Mobile terminated CTM: • **0** Disable • **1** Enable **<enableInterface>:** Character set (only Baudot is supported): • **0** Baudot **<ctmBaudotRate>:** Modulation rate: • **0** 45.45 Hz • **1** 50 Hz **+CTMSET?** displays the current settings and **+CTMSET=?** displays supported settings.
+DR=<n> **+DR?**	**V.42*bis* compression reporting** Sets whether the V.42*bis* compression status is returned (using the result code +DR: <type>) before going into the online data state, for either originated or answered calls: • **<n>=0** sets the modem not to report compression status. • **<n>=1** reports compression status. <type> can be one of four values: • NONE data compression is not in use • V42B Rec. V42*bis* is in use in both direction • V42B RD Rec. V42*bis* is in use in receive direction only • V42B TD Rec. V42*bis* is in use in transmit direction only **+DR?** returns the current setting for reporting. Service type reporting can be enabled with the **+CR** command (page 90). V.42*bis* compression is controlled by **+DS** (page 97).

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+DS [=<direction>] [,<negotiation>] [,<P1>][,<P2>] **+DS?**	**V.42*bis* compression control** Controls the functions of V.42*bis* data compression. See the GSM 04.22[18] specification for more information. **Supported values** *Note: This command must be used in conjunction with command* **+CRLP** *(page 92) to enable compression.* **<direction>** Specifies the desired direction(s) of operation of data compression: • **<direction>=0**: negotiated; no compression (V.42*bis* P0=0). • **<direction>=1**: transmit only. • **<direction>=2**: receive only. • **<direction>=3**: default, both directions, accept any direction (V.42*bis* P0=11)—the default. **<negotiation>** specifies whether or not the modem should continue to operate if the desired result is not obtained: • **<negotiation>=0**: Do not disconnect if V.42*bis* is not negotiated by the remote modem as specified in <direction>. (The default.) • **<negotiation>=1**: Disconnect if V.42*bis* is not negotiated by the remote modem as specified in <direction>. **<P1>** Specifies the maximum number of dictionary entries (512–2048 entries, with 512 as the default) which should be negotiated. **<P2>** Specifies the maximum string length (6–255 bytes, default 20) to be negotiated (V.42bis P2). **+DS?** reports the current settings.
+GMI	**Modem manufacturer** Returns a text string listing Sierra Wireless as the manufacturer of the modem. Equivalent to **+CGMI** (page 69).
+GMM	**Modem model** Returns a text string identifying the model of Sierra Wireless modem in use. Equivalent to **+CGMM** (page 69).
+GMR	**Current modem firmware version** Returns a text string identifying the current firmware revision of the Sierra Wireless modem. Equivalent to **+CGMR** (page 69).
+GOI	**Global object identification** Returns the ISO system Global Object Identification (GOI) of the modem. The general format is defined in ITU-T Recommendation X.208, and the encoding rules in ITU-T Recommendation X.209.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+GSN	**Display IMEI** Returns the IMEI (International Mobile Equipment Identity) of the modem. The IMEI uniquely identifies each device on the GSM network. The same value is returned by **+CGSN**. (See page 72).
+IFC [=<by_comp>] [,<by_modem>] **+IFC?**	**Local flow control** Sets or queries the local flow control between the computer and the Sierra Wireless modem in data state. **Supported values** **<by_comp>** specifies the method to be used by the computer to control the flow of received data from the modem: • **<by_comp>=0**: None. • **<by_comp>=1**: XON/XOFF on transmitted data (XON/XOFF on transmit data); do not pass characters to data stack. • **<by_comp>=2**: Line 133 (Ready for Receiving)—the default. **<by_modem>** specifies the method to be used by the modem to control the flow of transmitted data from the computer: • **<by_modem>=0**: None. • **<by_modem>=1**: XON/XOFF on received data. • **<by_modem>=2**: Line 106: Clear to send (CTS). *(Default.)* **+IFC?** returns the current settings.
+IPR[=<n>] **+IPR?**	**Fixed local data rate** Sets or queries a fixed local data rate for the local connection (between modem and computer): • **<n>=[bits per second]** sets the data rate. Permitted values are **1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200** (the default), and **230400**. • **<n>=0** instructs the modem to use the host's data rate automatically (autobauding). With this setting, the modem adjusts to the host data rate only once on start-up. The modem does not adjust to changes in the host data rate between start-ups. Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
+IPR (continued)	**Fixed local data rate (continued)** *Note: Watcher can only communicate with the modem when the data rate is at 115200 kbps. If you intend to run Watcher, using autobaud or any setting other than 115200, is NOT recommended.* *Note: When using autobauding, issuing a "ping"* **AT<CR>** *command (with no other characters) should yield an* OK *response. If not, send another* **AT<CR>** *to permit the modem to adapt to the host data rate.* *Note: When you change the data rate using +IPR, you must issue AT&W (to preserve the setting) then power cycle the modem.* **+IPR?** returns the current setting.
+VTD=<n> **+VTD?**	**Tone duration** Defines the length of tones emitted when using the **+VTS** command (page 99), with **<n>** in tenths of a second between 1 and 255. It does not affect the **D** command. If **<n>=0** the value is set to the default. (See "Factory Default Settings" on page 107.) **+VTD?** returns the current setting.
+VTS=<DTMF> or **+VTS=<tone1>, <tone2>, <duration>** or **+VTS=<DTMF>, <duration>**	**DTMF tone generation** This command allows the transmission of DTMF (Dual Tone Multi-Frequency, also known as Touch-Tone™ tones, used to access voice mail and other tone-controlled remote systems. The command is separate from **D**, which is used only for dialing. The command is write-only, and does not operate in data modes of operation. **Supported values** The string parameter of the command consists of combinations of the following, separated by commas: 1. **+VTS=<DTMF>** is a single ASCII character in the set **0-9, #,*,A-D**. This is interpreted as a single ACSII character whose duration is set by the **+VTD** command (page 99). In GSM, this command type operates only in voice mode. 2. **+VTS=<DTMF>,<duration>** is interpreted as a DTMF tone of different duration from that mandated by the **+VTD** command (page 99). In GSM, this operates only in voice mode.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
A/	**Reissue last AT command** Re-executes the last command string entered. The last-executed command remains in the command buffer until **AT** is entered again or the modem is reset or power-cycled. **A/** will reissue that same command. It executes immediately when the slash (**/**) is entered. *Note: This command is **not** preceded by* **AT** *and does not require* **<CR>** *to terminate.*
A	**Answer incoming call (or GPRS network request)** **GSM mode** When operating in *GSM voice, or CSD mode,* **ATA** instructs the modem to immediately go off-hook and attempt to establish a connection without waiting for a ring. This is used to answer an incoming call if the auto-answer status register (S0—see page 25) is disabled. The command presumes a RING has been received. If the command is issued without a RING, and the modem is in *command state,* the modem replies with OK and remains in command state. Once the RING arrives, the modem looks for carrier to negotiate the connection, and either issues: • CONNECT and enters data state; or • NO CARRIER and remains in command state. **GPRS mode** When operating in *GPRS packet mode,* the **ATA** command answers a network request for a PDP context activation announced by the unsolicited result code RING. The modem responds with CONNECT and enters the V.25*ter* online data state to initiate a GPRS connection.
D**##[n]**	**Make GPRS connection** Establishes a connection using the specified profile. The **!MPSETUP** is used to maintain profiles; up to three profiles are supported. (See page 56.) The GPRS profile used in the connection is specified by **n**: • **<n>=0** Default profile. (Set by the **!MPSETDFLT** command.) • **<n>=1** Profile 1 • **<n>=2** Profile 2 • **<n>=3** Profile 3 The connection uses the PDP context settings assigned using **+CGDCONT**, **+CGQMIN**, and **+CGQREQ** to the PDP Context Identifier 1. (That is, the <cid> must be 1. **D****##** cannot be configured to use any other value for the <cid>.) In order to establish a connection with specific QoS (Quality of Service) settings, or header or data compression settings, the settings must be assigned to PDP Context Identifier 1 (<cid>=1) using the **+CGDCONT**, **+CGQMIN**, and **+CGQREQ** commands.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
E[<n>]	**Command echo mode** Controls echoing of characters received from the host back to the host when in command state. This also affects framing of responses. (See "Response and Result Framing" on page 20.) **n** may be one of two values: • **0**: Disable echo • **1**: Enable echo (Default)
H[0] *Note: The* **0** *parameter (***ATH0***) is the only one permitted. It is optional and has no effect on the command.*	**Hang up (disconnect)** **GSM mode** When operating in *GSM voice, or CSD mode,* **ATH** or **ATH0** hangs up the call, disconnecting it. The modem goes from online condition to offline condition. **GPRS mode** When operating in *GPRS packet mode,* the **ATH** on-hook command may be used to reject a network request for PDP context activation announced by the unsolicited result code RING. The modem responds with OK. If there is no outstanding connection request, the modem responds with ERROR. *Note: This is an extension to the usage of the* **H** *command from the V.25*ter *standard.*
I[<value>]	**Display product identification** Displays model and version information. The **<value>** determines what information is displayed: • **<value>=0**Manufacturer and model • **<value>=4**Mobile ID used by the MT protocol. (See **!MPMTCONF** on page 50.) The Mobile ID is derived from the IMEI. (See **+CGSN** on page 72.) • **<value>=5**Firmware revision • **<value>=6**Bootloader revision
L **(ignored)**	**Set speaker loudness** This command is provided for compatibility reasons; no action is taken by the modem. Parameters are ignored.
M **(ignored)**	**Set speaker mode** This command is provided for compatibility reasons; no action is taken by the modem. Parameters are ignored.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
O[0] *The* **0** *parameter (***ATO0***) is the only one permitted. It is optional and has no effect on the command.*	**Switch from command state to data state** Switches modem to from online command state to online data state. The modem responds with the normal CONNECT response codes (if enabled) as if the connection were new. If the connection cannot be established, a NO CARRIER or NO ANSWER response results, as appropriate.
P **(ignored)**	**Pulse dialing** This command is provided for compatibility reasons; no action is taken by the modem. Parameters are ignored.
Q[<n>]	**Quiet—suppress result codes** Controls the return or suppression of result codes to the host computer. There are two values for **<n>**: • **0**: Result codes are returned from the modem. Default and recommended. • **1**: Enable Quiet mode, suppressing result codes.. If **<n>=0**, the modem returns OK. If **<n>=1**, result codes are suppressed and there is no response.
S<n>[=<x>] **S<n>?**	**S-Register Set/Query** Sets (or queries) the contents of the specified S-register **<n>** to the new value **<x>**. Zeros are assumed where parameter values are omitted. **Var.** **Range** **<n>** Valid S-register number (See Table 3-10 on page 104 on page 104 for values). **<x>** as determined by the S-register **<n>**.
T **(ignored)**	**Tone dialing** This command is provided for compatibility reasons; no action is taken by the modem. Parameters are ignored.
V[<n>]	**Verbose result code format** Specifies whether the modem displays the result codes in numeric format (non-verbose) or as words (verbose). See page 106 for a numerical list of the result codes. *Note: Numeric codes are returned as ASCII character numerals.* Continued on next page.

Table 3-9: Command Reference Table (ASCII Alphabetic)

Command	Description
V[<n>] (continued)	**Verbose result code format (continued)** This command also affects framing of responses (see page 20 for details). Settings for **<n>** are: • **0**: Numeric result codes • **1**: Verbose result codes (default) **Result codes** • If **<n>=0**, the result code is 0. • If **<n>=1**, the result code is OK. (The default.) • ERROR or 4 results otherwise, depending on the current state (verbose or not)
Z *Note: Additional commands on the same line are ignored.*	**Reset modem to user-defined profile** The modem disconnects any active call, and then resets the command and register parameters to the defaults stored in the non-volatile memory's user profile by the **AT&W** command (see page 24).

Status Registers

Some of these registers relate to the call progress timing at the IWF (the interface between the GSM network and the PSTN) with the PSTN connection. These are noted below using the (Remote) tag.

Table 3-10: S registers

Reg.	Description	Range	Default	Units
0	**Number of rings before answer (or accept/reject PDP context activation request)** **GSM mode** When operating in *GSM voice or CSD mode, the* **S0** status register is used to set the number of rings before automatically answering a call—**<n>** is a numeric value between 0 and 255 representing the number of rings before pickup. A value of **<n>=0** deactivates auto-answering.	0–255	000	rings
0 (cont.)	**GPRS mode** When operating in *GPRS packet mode,* the **S0** status register can be used to set whether the modem automatically accepts incoming PDP context activation requests from the network. • If **<n>=0**, the modem will not automatically accept a network connection request. • If **<n>=1** or any other greater value, the modem will automatically accept a connection request. *Note:* **ATS0=0** *does not perform an automatic GPRS detach.* **Inquiry** **ATS0?** returns the current setting of the register.	0, 1	0	Boolean
3	**Command line termination character (usually <CR>)** Sets the standard end-of-line character used to indicate the end of an AT command. This character is also used as the carriage return character for framing responses and result codes in command state. The default and standard line termination character is the carriage return <CR> (ASCII 13).	0–127	013 (CR)	ASCII
4	**Response formatting character (usually <LF>)** Sets the standard character sent by the modem to the host at the end of a response or return code in command state. The default and standard response-end character is the line feed <LF> (ASCII 10).	0–127	010 (LF)	ASCII
5	**Command line editing character (usually <BS>)** Sets the standard character used to backspace when editing on the command line. The default and standard response-end character is the backspace <BS> (ASCII 8).	0–127	008 (BS)	ASCII

Table 3-10: S registers (cont.)

Reg.	Description	Range	Default	Units
6	**Length of pause before dialing (ignore dial tone)** This register denotes the wait time (between 2 and 10 seconds) before a blind dial, with no dial tone detection. The default value is **<n>=2** seconds. The value of ATS6 is used when the ATX command is set to 1 or 3. ATX settings of 2 and 4 enable dial tone detection and disable blind dialing. Therefore, when X is set to 2 or 4, the value of S6 is ignored.	0–255	002	seconds
7	**Wait time for connection** This register sets the limit, between 1 and 255 seconds, for how long the modem will wait for a carrier signal from a remote modem before hanging up. The default value is **<n>=50** seconds.	1–255	060	seconds
8	**Length of comma pause** This command is provided for compatibility reasons; no action is taken by the modem. Parameters are ignored.	0–255	002	seconds
10	**Carrier detection and carrier loss delay** Specifies how long the carrier from a remote modem can be absent before the modem disconnects (between 0 and 255 seconds). Longer delays allow temporary disruptions to the carrier without disconnecting. Shorter delays detect dropped carriers more efficiently when the connection is good. The default value is **<n>=15** seconds. A setting of **<n>=255** causes the modem to disable carrier detection and presume the carrier is always present.	1–255	015	0.1 s

Result Codes

The Sierra Wireless modem returns result codes when AT commands are entered. These result codes can be numeric or verbose (English language), as described beginning on page 19 of this document. The available codes are described in the following sections.

Basic Result Codes

This table provides a numerical list of the standard result codes possible.

Table 3-11: Result codes

Code	Verbose	Meaning
0	OK	Command executed without errors
1	CONNECT	Connected at any of the supported speeds.
2	RING	Alerting Signal (Ring) signal received from the network.
3	NO CARRIER	Carrier signal lost or not detected. Unable to activate the service.
4	ERROR	Command not recognized or could not be executed. Illegal command. Error in command line. Command line exceeds buffer size. Parameters out of range.
6	NO DIAL TONE	Dial tone not detected within timeout and subsequent commands not processed.
7	BUSY	Reorder (Busy) signal detected and subsequent commands not processed.
8	NO ANSWER	Five seconds of silence not detected after ring back when “@” (quiet answer) dial modifier is used.

Factory Default Settings

&F (Reset modem to factory default) restores these settings, overwriting any that currently differ from the factory defaults.

Table 3-12: Profile settings

Command	Description	Factory
&C	Data carrier detect (DCD) options	1
&D	Data terminal ready (DTR) options	2
+CBST	Select bearer service type	7,0,1
+CCWA	Call waiting control	0
+CLIP	Calling line identification presentation	0
+CLIR	Calling line identification restriction	0
+CMEE	Report mobile equipment error	0
+CMGF	Select SMS message format	0
+CNMI	New SMS message indications	2,1,0,0,0
+CR	Service reporting control	0
+CRC	Cellular result codes for incoming calls	0
+CREG	GSM network registration	0
+CRLP	Radio link protocol	61,61,48,6,1,3
+CSDH	Show SMS text mode parameters	0
+CSMS	SMS message service	0
+DR	V.42bis compression reporting	0
+DS	V.42bis compression control	3,0,512,20
+IFC	Local flow control	2,2
+IPR	Fixed local data rate	115200
E	Command echo mode	1
L	Set speaker loudness (ignored)	0
M	Set speaker mode (ignored)	0
Q	Quiet—suppress result codes	0
V	Verbose result code format	1

Table 3-12: Profile settings (cont.)

Command	Description	Factory
S registers		
S0	Number of rings before answer (or accept/reject PDP context activation request)	0 (disabled)
S3	Command line termination character (usually <CR>)	013 (CR)
S4	Response formatting character (usually <LF>)	010 (LF)
S5	Command line editing character (usually <BS>)	008 (BS)
S6	Length of pause before dialing (ignore dial tone)	002 (2 seconds)
S7	Wait time for connection	060 (60 seconds)
S8	Length of comma pause	002 (2 seconds)
S10	Carrier detection and carrier loss delay	015 (1.5 seconds)

Appendix A: ASCII Table

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
NUL	0	00	DC4	20	14	(	40	28
SOH	1	01	NAK	21	15	)	41	29
STX	2	02	SYN	22	16	*	42	2A
ETX	3	03	ETB	23	17	+	43	2B
EOT	4	04	CAN	24	18	,	44	2C
ENQ	5	05	EM	25	19	-	45	2D
ACK	6	06	SUB	26	1A	.	46	2E
BEL	7	07	ESC	27	1B	/	47	2F
BS	8	08	FS	28	1C	0	48	30
HT	9	09	GS	29	1D	1	49	31
LF	10	0A	RS	30	1E	2	50	32
VT	11	0B	US	31	1F	3	51	33
FF	12	0C	SP	32	20	4	52	34
CR	13	0D	!	33	21	5	53	35
SO	14	0E	“	34	22	6	54	36
SI	15	0F	#	35	23	7	55	37
DLE	16	10	$	36	24	8	56	38
XON	17	11	%	37	25	9	57	39
DC2	18	12	&	38	26	:	58	3A
XOFF	19	13	’	39	27	;	59	3B
<	60	3C	S	83	53	j	106	6A
=	61	3D	T	84	54	k	107	6B
>	62	3E	U	85	55	l	108	6C
?	63	3F	V	86	56	m	109	6D
@	64	40	W	87	57	n	110	6E
A	65	41	X	88	58	o	111	6F
B	66	42	Y	89	59	p	112	70
C	67	43	Z	90	5A	q	113	71

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
D	68	44	**[**	91	5B	**r**	114	72
E	69	45	****	92	5C	**s**	115	73
F	70	46	**]**	93	5D	**t**	116	74
G	71	47	**^**	94	5E	**u**	117	75
H	72	48	**_**	95	5F	**v**	118	76
I	73	49	**‘**	96	60	**w**	119	77
J	74	4A	**a**	97	61	**x**	120	78
K	75	4B	**b**	98	62	**y**	121	79
L	76	4C	**c**	99	63	**z**	122	7A
M	77	4D	**d**	100	94	**{**	123	7B
N	78	4E	**e**	101	95	**|**	124	7C
O	79	4F	**f**	102	96	**}**	125	7D
P	80	50	**g**	103	97	**~**	126	7E
Q	81	51	**h**	104	98	**DEL**	127	7F
R	82	52	**i**	105	99		128	80

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